

MAY, 1941

Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

FEATURING
AGRICULTURAL LIMESTONE AND LIME

SUCTION GRATE
ROTARY KILN



F. L. SMIDTH & CO.

60 EAST 42ND STREET

CEMENT ENGINEERING
CEMENT MACHINERY

NEW YORK, N. Y.

Only ONE Crusher Needed for the Job!



The WILLIAMS "SLUGGER"
crushes ONE MAN size rock or
screen rejects to 1 1/4" — 3/4" or
AGRICULTURAL LIMESTONE
in One Operation

Open view of Will-
iams "Sluggger"
crusher showing
heavy duty hammers,
liners and breakers.

The Williams "Sluggger" Crusher and Pulverizer now makes it possible to crush large pieces of stone weighing from 75 to 100 pounds to AGRICULTURAL LIMESTONE in One Operation. This not only eliminates slogging but also does away with the unnecessary expense of a primary crusher.

The "Sluggger" represents the most advanced type of crushing equipment on the market today and with seven sizes to choose from producing from 4 to 30 tons per hour, every producer whether large or small can now afford to install a Williams.

Outstanding "SLUGGER" Features

- **MANGANESE STEEL HAMMERS.** Heavy Duty Slugg end hammers are standard equipment in the "Sluggger".
- **HAMMER ADJUSTMENTS OVERCOME WEAR.** Discs are arranged so that the hammers can be set out as they wear on the end.
- **MANGANESE STEEL ADJUSTABLE BREAKER PLATE.** Adjustable towards the hammers.
- **ELECTRIC STEEL FRONT END.** The part which holds the breaker plate is electric steel casting—3 1/2 times stronger than cast iron.
- **COVER LINERS 1" THICK.** Manganese steel liners.
- **SIDE LINERS 1" THICK.** Manganese steel liners.
- **SEVEN SIZES.** 30 to 150 horsepower, stationary or portable models.

THE WILLIAMS PATENT CRUSHER & PULVERIZER CO.

800 St. Louis Avenue

St. Louis, Missouri

Sales Agencies Include

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WILLIAMS
PATENT CRUSHERS GRINDERS SHREDDERS

...Where Service Calls for GREATER STRENGTH--DURABILITY

USE **LINK-BELT** STEEL CHAINS

Profit by their dependable, reliable, low-cost service . . . whether for drives, elevators or conveyors—slow or high speed operation. They are available in scores of standard types and sizes, with a wide range of attachment styles.

Like Link-Belt malleable, Promal and alloy chains, they are accepted as the recognized standard—the result of over 66 years' experience in chain making. Look for this double $\rangle \langle$ arrow trade mark on every link. It's your assurance that you are getting genuine Link-Belt chains.

LINK-BELT COMPANY

Indianapolis, Chicago, Philadelphia, Atlanta, Dallas, San Francisco, Toronto
Offices, warehouses and distributors in principal cities 0813A

"SS" Class Short Pitch

For medium and heavy duty drives; made with offset or straight side bars; with or without bushings or rollers.



"SS" Class Long Pitch

For heavy-duty elevating and conveying work; made with plain carbon steels, or special alloys, special heat treatments, etc.



"SS" Class Shouldered Pin

Used principally on special machinery, and on relatively slow speed transmissions and operating mechanisms. Well proportioned, accurately made, with high tensile properties.



"C" Class "Combination"

For heavy-duty elevators handling sticky or semi-abrasive materials. A combination of alternate cast block links (Malleable Iron, PROMAL, or Cast Steel), and outside bar steel side bars, connected by steel pins or rivets.



"SS" Class Without Rollers

For heavy-duty elevators and conveyors not requiring roller type chain. The shorter pitch chains are well suited and widely used for power transmission at low speeds. The hardened steel bushings minimize the wear from sprocket tooth action, and resist wear in chain joints under gritty and abrasive service.



LINK-BELT CHAINS

MALLEABLE • PROMAL • STEEL • ALLOYS

For Conveying and Power Transmission

MAY 17 1941

Rock Products

Recognized the World Over as the Leader in Its Field

With which has been consolidated the journals *Cement and Engineering News* (founded 1896) and *Concrete Products* (established 1918)

VOL. 44, No. 5, MAY, 1941

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PUBLICATION OFFICES
309 West Jackson Blvd., Chicago, Ill.
Telephone—Harrison 7890

Nathan C. Rockwood
Editor

Ralph S. Torgerson Bror Nordberg
Managing Editor Associate Editor

Frank Richter
Assistant Editor

★

CONTRIBUTING EDITORS

Victor J. Azbe Dr. F. O. Andersregg
St. Louis, Mo. Newark, Ohio

★

FIELD REPRESENTATIVES

A. B. Maynard C. P. Teats

★

BUSINESS STAFF

Richard M. Ward, Manager
L. V. Rodda, Circulation Manager
John R. Thompson, Vice-President and Treasurer

ADVERTISING REPRESENTATIVES

Ralph Sullivan, Eastern Representative
522 Fifth Avenue, New York City
Tel. Murray Hill 2-7888
George M. Earnshaw
405 Erie Building
2123 East 9th Street, Cleveland, Ohio
Tel. Main 9645
Louis C. Thاون
Western Representative
Chicago Office, Tel. Harrison 7890
Don Harway and Co.
West Coast Representatives
420 Market St., San Francisco, Calif.
Tel. Exbrook 6029
318 W. Ninth St., Los Angeles, Calif.
Tel. Tucker 9706

LONDON OFFICE

Donald F. Hunter, Manager
2, 3, 4 Cockspur St., S. W. 1, England
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ROCK PRODUCTS Bears the Twin Hall-Marks of Known Value.



★



Impartial measurement of reader interest in terms of paid circulation.

Authentic facts relating to editorial scope and readership analysis.

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ROCK PRODUCTS

New
LONG LIFE GREASES

GULF ANTI-FRICTION GREASE

GULF PRECISION GREASE

**.... FOR BETTER LUBRICATION OF BALL
AND ROLLER BEARINGS**

WITH machines required to run continuously for longer periods each week, improved lubrication is necessary for better defense against sabotage by friction. To better protect ball or roller-bearing equipped units, Gulf has developed two new greases—Gulf Anti-Friction Grease, recommended for heavy-duty service—and Gulf Precision Grease, for lighter duty and higher speeds.

Both have a comparatively high melting point and are specially prepared for greatest resistance to oxidation and separation.

Gulf's newly developed method of compounding, employing special high-pressure kettles and mixing methods, produces these greases with a relatively smooth, non-fibrous texture, which will undergo a

minimum of change in consistency in service.

A wide range of standardized consistencies is available for any method of application or operating condition. Write today for complete information.



Gulf Oil Corporation - Gulf Refining Company
3800 Gulf Building, Pittsburgh, Pa.

RP

Please send me without obligation complete information about your new long life greases for anti-friction bearings.

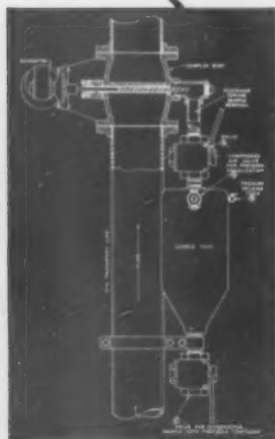
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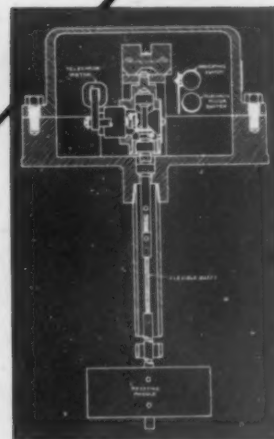
Company _____



Fuller-Kinyon Conveying Systems, built in both stationary and portable types.



Fuller-Anderson Sampler for continuous sampling of dry pulverized materials.

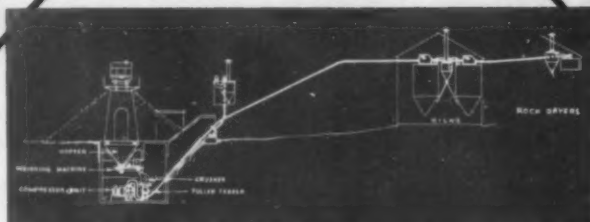


Material-Level Indicator, for controlling high and low-level limits of material in bins.

**COST
SAVING
EQUIPMENT
FOR
THE
CEMENT
PLANT
BY
FULLER**



Fuller Rotary Feeder for dry pulverized materials.



The Airveyor Pneumatic Conveying System, conveying crushed coal to kilns and rock dryers.



Fuller Rotary Gate Valve.



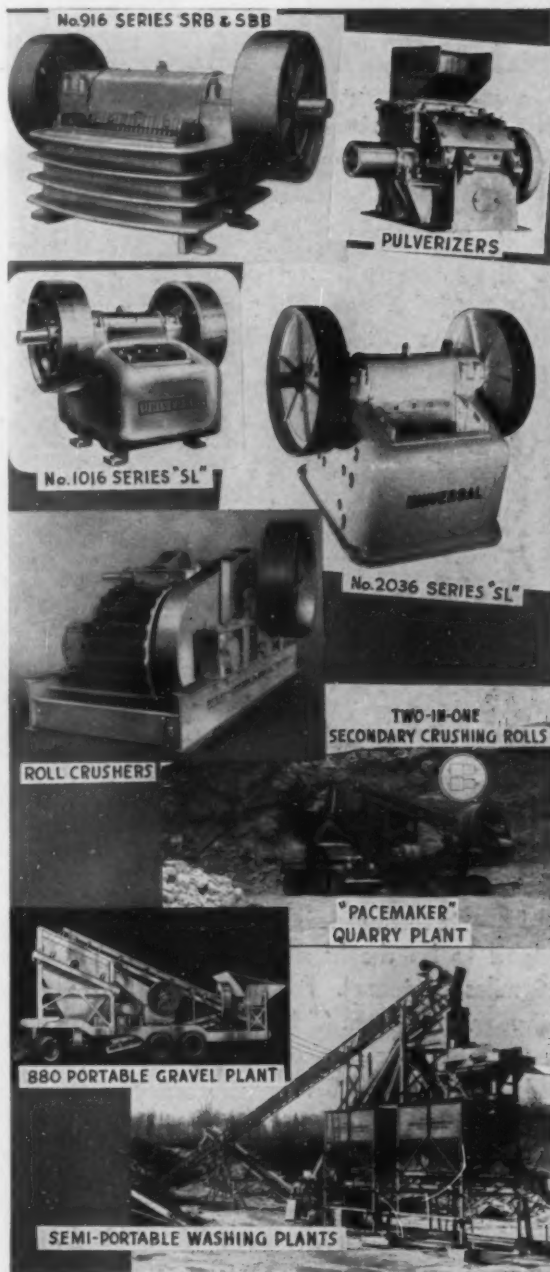
Fuller Rotary Compressors, built in single and two-stage types, capacities to 1800 C.F.M., 125-lb. pressure.



Fuller Air-Quenching Coolers for clinker, lime, ore, and other similar materials.

FULLER COMPANY - CATASAUQUA, PA.
CHICAGO—Marquette Bldg. SAN FRANCISCO—Chancery Bldg.

These times demand **UNIVERSAL** **CRUSHING EQUIPMENT**



- There's lots of work to be done in a hurry—training camps, defense projects, new roads and road improvements to handle accelerated traffic, housing projects—it's surely no time to use obsolete equipment and make-shift set-ups.
- "Get in and pitch" with Universal profit-proved equipment. It's geared to the times. There's a Universal Crusher, Pulverizer and Stationary or Portable Plant just suited to your needs that will crush your material any size you want it, wherever you are, faster and at lower cost than any other equipment built to do the job.
- Name any equipment in this complete line and we will show you production and operating cost figures that will convince you if you know anything about the stone and gravel business—not just isolated cases, but testimony aplenty from the roll call of Universal customers.

Up-to-the-minute equipment for high production and economical operation is detailed in this 60-page catalog—send for your copy today!

"Don't get caught short." Demands are heavy—plan your purchases now. Universal field engineers and sales-service representatives in most cities will make helpful recommendations.



UNIVERSAL CRUSHER COMPANY, 617 C Ave. West, Cedar Rapids, Iowa

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

12 MILLION DOLLAR DELAWARE AQUEDUCT CONTRACT Timken Bits USED 100% FROM START TO FINISH

View of effluent chamber excavation by Frazier-Davis showing a 15' shaft dowlake capped with concrete and flanked by two down pipe shafts.



The Frazier-Davis Construction Company of St. Louis was awarded contract #321 of the Delaware Aqueduct Project for \$11,924,450. It included driving 11,900 feet of 13½' tunnel, 23,100 feet of 15' tunnel and the removal of 60,000 cubic yards of rock in an open cut.

TIMKEN Rock Bits drilled every foot of hole on this entire contract! Serious drilling started in June 1939. Using 4" automatic drifters and working 24 hours per day 5 days per week the last heading "holed thru" on Christmas Eve 1940.

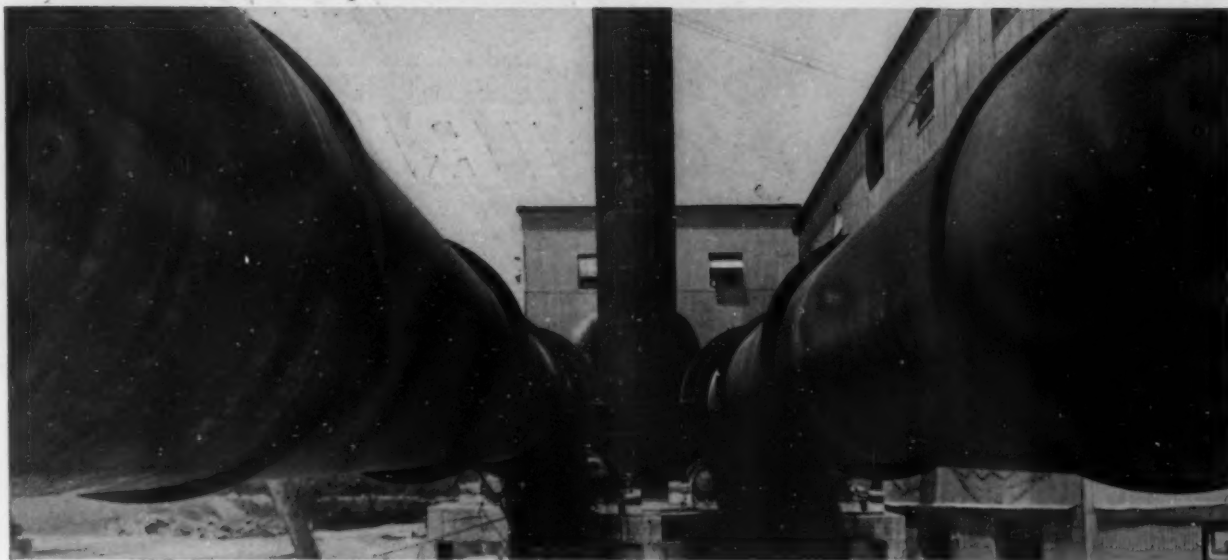
The rock on this contract, granitic gneiss and quartz throughout, is generally acknowledged to be the hardest along the entire 85 miles of tunnel. Footage per TIMKEN Bit use varied from 6" to 2' and the monthly variable average of uses per bit was between 3.32 and 5.45.

The fact that Frazier-Davis, one of America's foremost contractors, used TIMKEN Bits 100% on their 12 million dollar job proves that TIMKEN Bits really have "something". Write us, we'll be glad to show *you* what it is.

THE TIMKEN ROLLER BEARING
COMPANY, CANTON, OHIO



about *Half a Mile of* **TRAYLOR** *KILNS and COOLERS*



WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

Welded or Riveted
Stacks, Tanks and
Bins for any purpose.

That's the record for the first three months of 1941, but in itself the fact does not mean much. However, when it is added that the distance is the aggregate of a dozen units destined for as many locations and in several separate industries, we feel a justifiable pride in such an outstanding demonstration of the confidence displayed by the rock products and allied industries in Traylor Kilns, Coolers and Dryers.

That confidence is not undeserved,

for during more than thirty years we have always striven to supply equipment specially designed to meet the requirements of our good customers. That we have succeeded is attested by the fact that we have supplied kilns, coolers and dryers by the hundreds, to "the greatest" in the cement, lime, chemical and other industries.

Write us today about YOUR problem. We can help you increase your profits!

TRAYLOR

ENGINEERING & MANUFACTURING CO.

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THE MOTOR YOU
ASKED FOR IS

Strong



New **TRI-CLAD** Motor

BUILT FOR PROTECTION FIRST...TO LAST

No other standard motor, we believe, has ever met the general-purpose requirements of industry with so well-balanced a combination of performance characteristics, convenience features, and provisions for protection. Integral-hp sizes up to 20 hp (at 3600 rpm), open or splashproof, are now available. Capacitor-motors up to 5 hp (at 3600 rpm) can also be furnished.

Combines 500 man-years of RESEARCH
with 62 years of motor EXPERIENCE

on Protection

Extra Protection

AGAINST PHYSICAL DAMAGE

A truly modern motor, you told us, must be able to withstand accidental blows, flying chips, dripping liquids, and occasional bumps in moving or mounting. That's how we built the Tri-Clad motor!

We made the frame and end shields of cast iron; used channel and rib sections to give ample strength where needed, without increasing the weight; cast the feet integrally with the frame to make them sturdy and rigid. We completely enclosed the upper portion and carefully baffled all ventilating openings to protect vital motor parts. We provided the bearings with cast-iron housings and made them dust tight. And the finishing touch—we give the motor a tough coat of paint that protects the metal parts against rust and corrosion.

The Tri-Clad motor is fully protected against the accidental ill-treatment some motors encounter all the time, and which *all* motors encounter some of the time. As a safeguard against production interruptions, as a prime factor in lowering costs, as an extra increment of value on machines you build, you'll find that this new motor means extra profit protection, too.

Be sure your next induction motors are Tri-Clad. General Electric, Schenectady, N. Y.

Extra Protection

AGAINST

ELECTRICAL BREAKDOWN

New stator windings of Formex wire give extra protection internally against moisture, oil, abrasion, and heat aging. New synthetic impregnating and protecting varnishes make a rigid unit with a hard finish.

Extra Protection

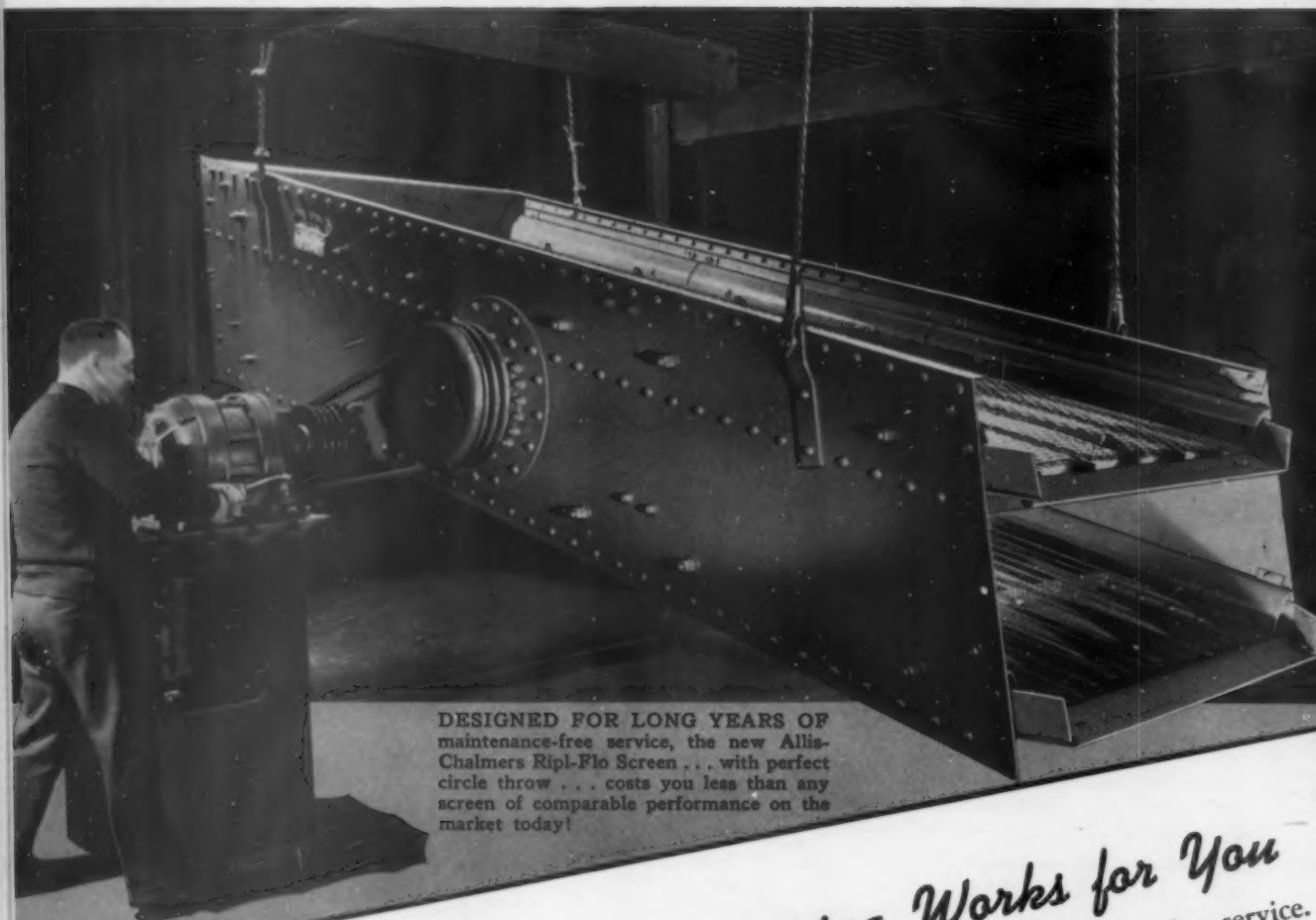
AGAINST

OPERATING WEAR AND TEAR

Sleeve bearings of new design have longer life and greater load capacity. The one-piece, cast-aluminum rotor winding, with fans cast integrally, is practically indestructible.

GENERAL  ELECTRIC

DO YOUR SCREENS



DESIGNED FOR LONG YEARS OF maintenance-free service, the new Allis-Chalmers Ripl-Flo Screen . . . with perfect circle throw . . . costs you less than any screen of comparable performance on the market today!

How Cooperative Engineering Works for You

As the world's largest manufacturer of rock and ore reduction machinery, Allis-Chalmers has amassed a tremendous interrelated engineering knowledge and experience that enable us, in cooperation with your own engineers, to analyze your individual problems from the viewpoint of your entire production process.

This is our cooperative engineering service. It is your assurance that the Allis-Chalmers equipment you buy will perform in perfect harmony with your other equipment . . . give you the teamwork so necessary to production efficiency. Why not let us give you full details?



Let **ALLIS-CHALMERS COOPERATIVE**

"GALLOP"?

Perfect Circle Throw of Allis-Chalmers Ripl-Flo Imparts Uniform Vibration to Each Square Inch of the Deck. Read the Story of This Remarkable New Screen that Costs You Less Than You Pay for Any Screen with Comparable Performance on the Market Today!

MANY OPERATORS HAVE had "galloping" screens in their plants . . . screens that shake the supporting structures and make uniform efficiency and screening results uncertain because of erratic material flow over the screen deck.

That's why the new Allis-Chalmers Ripl-Flo . . . with uniform circle throw . . . has gained such wide-spread acceptance. For Ripl-Flo's circle throw imparts uniform vibration to each square inch of the deck. Material doesn't slow down as it reaches the middle of the screen. You're sure to get exactly the right tonnage for a given angle . . . and get it with maximum screening efficiency!

Big Saving in Power Costs!

Equally important, the Ripl-Flo does not shake material . . . it *rolls* it over and over . . . practically eliminating blinding even

on small sizes. And dynamic balancing also means lower power consumption for you . . . *only 60%* of that required by most screens of similar capacity!

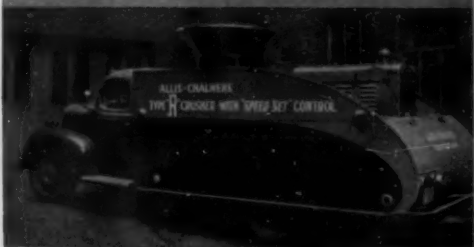
Because of this same dynamic balancing, the Allis-Chalmers screening specialists give you a screen with *smoother* operation. There's no rough period in starting or stopping . . . no lateral movement while running . . . no gallop!

Ripl-Flo Costs You Less!

Best of all, because all superfluous parts are eliminated, you get the remarkable new Ripl-Flo Screen at a *cost that's actually less* than you pay for any screen with comparable performance on the market today!

For complete information, call the district office near you. Or write direct to Allis-Chalmers, Milwaukee, for your copy of Bulletin B-6151.

*News of
other Allis-Chalmers
Products that cut
your costs!*



TO SHOW OPERATORS HOW THE new Allis-Chalmers Type "R" Crusher works on their own product, a No. 322 with "Speed-Set" Product Control has been mounted on this truck now touring the country.



ALL-WELDED CONSTRUCTION OF Allis-Chalmers Rotary Kilns makes lining with fire-brick easier . . . increases refractory life by eliminating loose joints . . . reduces total weight.



FOR A FINER, MORE UNIFORMLY ground cement, plants all over the world turn to Allis-Chalmers cylindrical grinding mills like the dry grinding ball mill for a Peruvian cement plant shown here.

A 1380

ENGINEERING *Cut your costs*

ATLAS MANASITE DETONATORS

Another
"ATLAS FIRST"

Some People always question Progress

FROM the steamboat to the stratoliner...from the pony express to the radio...progress has never gone unquestioned. People scoffed at Fulton, they laughed at Edison.



Atlas Manasite Detonators—a great step forward in safer blasting—have been no exception. Some people at first hesitated to use them. Yet—more and more blasters are using Atlas Manasite Detonators. Once they try

them, blasters like the dependability of Atlas Manasite Detonators. Re-orders and new orders tell

the story—over 100,000,000 already have been used.

Atlas Manasite Detonators offer an increased margin of safety... with no sacrifice in detonating efficiency, and at no increase in cost. Safety precautions become, not less important, but more effective.

Are you using this advance in greater safety?

ATLAS

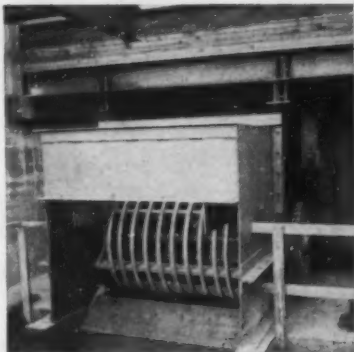
EXPLOSIVES

"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington, Del. • Offices in principal cities • Cable Address—Atpowco

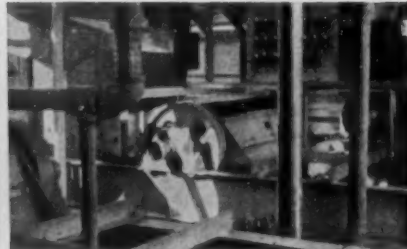
WATER FOR NEW YORK CITY



View of one of plant's two 36' x 6' TelSmith Reciprocating Plate Feeders, and No. 540 TelSmith Rotary Grizzly.



Plus 4" gravel goes to a No. 16-B TelSmith Gyrotory Primary Crusher. Minus 4" gravel and sand is by-passed.



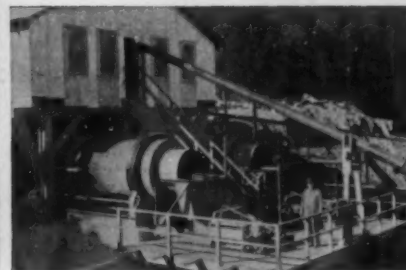
One 5' x 12' Double Deck and two 3' x 12' TelSmith Triple Deck Pulsators act as scalping, preliminary sizing and sand separating screens.



One of the two No. 36 TelSmith Gyro-sphere Crushers producing minus 1 1/2" or minus 3/4" product as required.



TelSmith Steel Frame Belt Conveyors take finished sand and gravel to steel bins equipped with TelSmith Bin Gates.



Two 72" x 10' 6" TelSmith Super-Scrubbers thoroughly clean the gravel, and eliminate any clay or soft stone.



Two 3' x 8' TelSmith Double Deck Screens rinse and size the gravel. The lower 1/4" deck dewaters the gravel.

800,000 yds. of aggregate
for Delaware Aqueduct
BEING SUPPLIED BY
**TELSMITH
PLANT**



Processing 800,000 cu. yds. of concrete aggregates for the big Delaware Aqueduct. And meeting the tough specifications of the New York City Board of Water Supply—1 1/2" and 3/4" gravel, and minus 1/4" sand with no crusher grits. A big job! And it takes a big tonnage plant! The Rossoff Sand & Gravel Corp. has just such a plant near Kerhonkson, N. Y.

In co-operation with Mr. Samuel R. Rossoff and his engineers, this new and completely modern plant was designed by TelSmith. TelSmith built the machinery...

supervised its installation... co-ordinating and balancing every unit. And the plant is turning out its required tonnage every hour. TelSmith sound engineering experience, TelSmith high grade equipment, and TelSmith centralized responsibility, here as in so many other plants, delivered all-around satisfactory results.

Are you about to build a new gravel pit, or quarry plant? Or planning to expand your present plant? Then it most certainly will pay you to find out about TelSmith complete plant service and equipment.

Get Bulletin G-11. Sent free, on request.

G-8

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Toronto, Ont.

... WHATS

Yes—SOMPIN'S

WE'RE NOT TELLING

BUT... WE'LL LIFT THE LID JUST A LITTLE

Each year the Portland Cement industry of the world looks forward to the Annual Cement Number of ROCK PRODUCTS published in August.

Each year the demand for extra copies of

this issue increases; indicative of the authoritative and informative editorial content.

The articles published in the 1939 Cement Number, altho published two years ago, if published today would present valuable operating data and information about standard practices of tomorrow.

***CEMENT PRODUCTION UP 40.83%**

***CEMENT SHIPMENTS UP 54.46%**

**U. S. Bureau of Mines Figures for the first quarter in 1941 as compared with the first quarter in 1940*

Increased production means ever increasing purchasing of Equipment and Supplies.

Tell The Cement Industry what you've got—how it works—how it can increase plant capacities—insure greater reliability—simplify maintenance—who uses it and where it can be bought—in the

August, 1941 Cement Number of ROCK PRODUCTS.

"Enter a New Cement Era", was the theme of the 1940 Cement Number. This issue gave a complete picture of what type of problems the cement industry would have to contend with. It featured how some of the more progressive producers were keeping pace with the new demands from users of cement. It presented information on

COOKING? BREWING' YET



specifications and operations the entire industry was waiting for.

The 1941 Cement Number will again be published in August. We can now lift the lid a little and tell you that it will be equally as informative and authentic editorially as the 1940 and 1939 cement numbers.

But . . . next month we'll lift the lid completely and tell all. We're just warning you that the August 1941 Cement Issue will be something big and important to look forward to.

The cement industry is one of the best equipment markets any manufacturer would

want. Now with production and shipments going steadily up manufacturers of equipment and supplies have a real opportunity of reaching buyers in a buying industry, through the publication that gives information its readers must have.

A special sepia section will be available for advertisers. Make your plans NOW to be adequately represented in this issue. Early space reservations assure the best positions. Forms close July 20th.

Let us send you a copy of last year's *Cement Number* and full information. There's no obligation.

Rock Products

309 West Jackson Blvd.
Chicago, Illinois



KOEHRING LONGER RADIUS...BIGGER CLEAN-UP AREA...CUTS SWING TIME

Saving swing time in shovel operation...multiplied hundreds of times each shift...is the sure way to increase production...and increase the profit. Koehring longer radius for clean-up gives you a bigger clean-up area...permits the hauling unit to be spotted farther into the cut...closer to the dipper...reduces swing time...and it's the swing time that counts! Be sure the next shovel you buy has this important time-saving advantage...Buy a Koehring!

KOEHRING COMPANY
MILWAUKEE • WISCONSIN



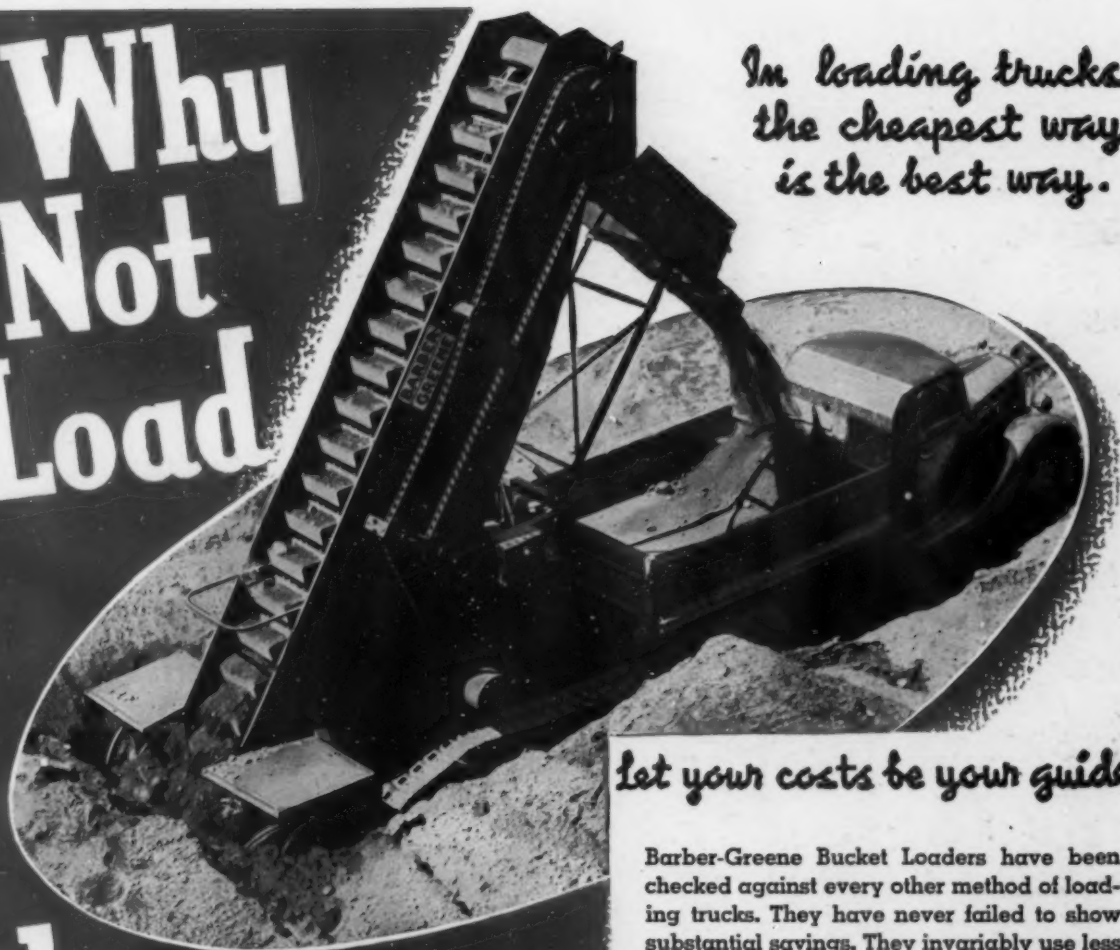
Check the large clean-up area of the Koehring Shovel...It saves swing time and increases your production-profit.

HEAVY-DUTY CONSTRUCTION EQUIPMENT



Why Not Load

*In loading trucks
the cheapest way
is the best way.*



the Cheapest Way?

Let your costs be your guide!

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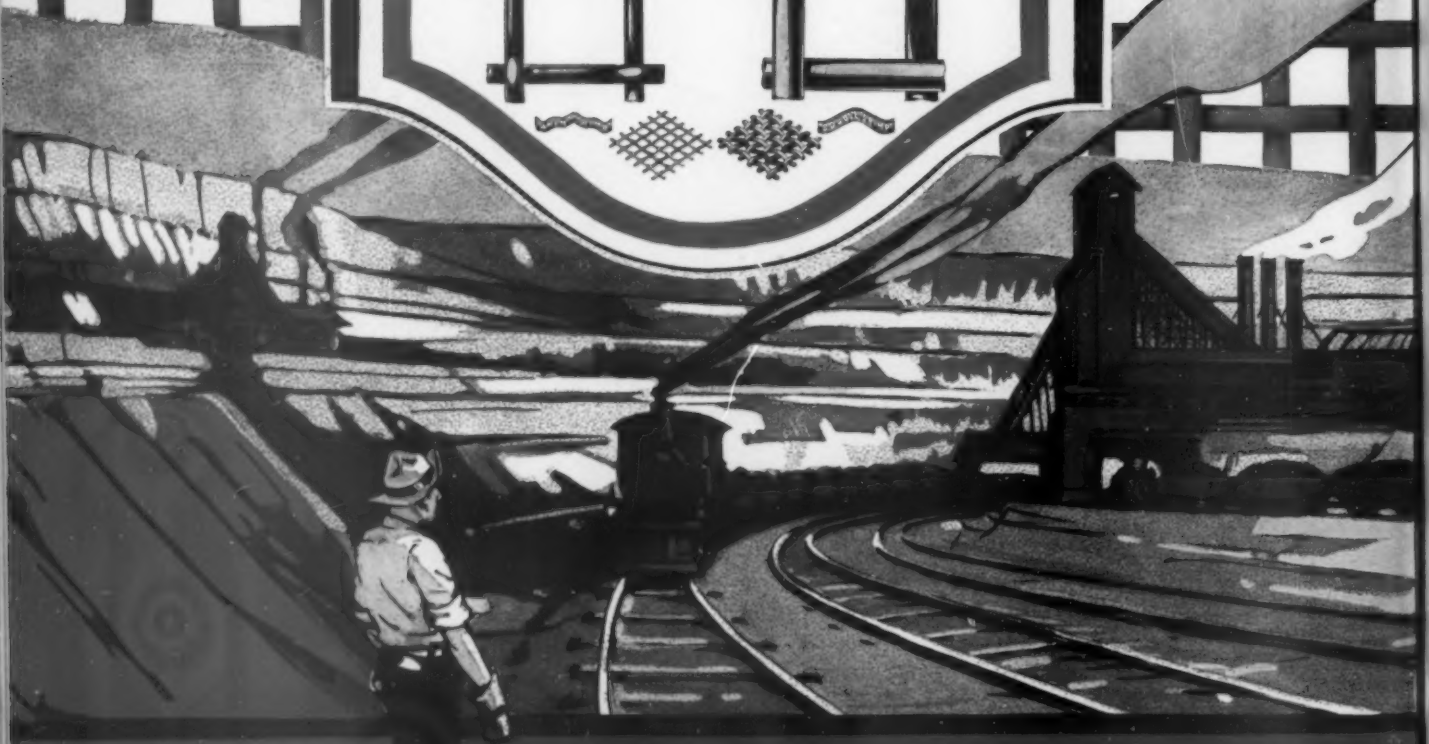
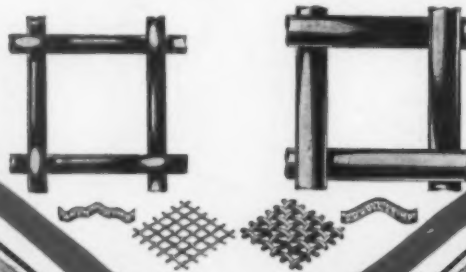
•
SUPER-HARD, SUPER-TOUGH, SUPER-STRONG

CONTROLLED-TEMPER SUPER-LOY
WOVEN WIRE SCREENS

withstand abrasion longer —

endure vibration better —

resist fatigue to the utmost



The background at top of page shows the "Perfect" Double-Crimp Weave.
The small cuts in the center panel compare Arch-Crimp Weave and Double-Crimp Weave.
The border at foot of page shows "Perfect" Double-Crimp Steel Wire Cloth which has been hot-dip galvanized after weaving.
Samples on request.

The **LUDLOW-SAYLOR**
WIRE COMPANY
SAINT LOUIS

Rock Products

309 WEST JACKSON BOULEVARD
CHICAGO, ILL.

May 1, 1941

Dear Subscriber:

New York City: A prominent man, who knows international politics, recently described the war as a fight between an elephant and a whale--the elephant being practically unbeatable on land, and the whale on the water; but unable to come to grips with each other in a decisive encounter. Hence the war may be of much longer duration than any, or at least most of us, anticipate--maybe ten or twenty years before all parties are completely exhausted. If this is a true picture, what a tremendous effect on our current and future economy!

San Jose, Calif.: Permanente Corp. is reported to have mortgaged 800 items of machinery and equipment in its new cement plant for \$2,000,000 to obtain funds for the Corporation's projected \$12,000,000 magnesium plant.

Fresno, Calif.: Out of sales of \$707,910 in 1940, the Yosemite Portland Cement Co. was able to retain \$4,608 as net profit. It reduced its sales expense about \$18,000, more than half of which was accomplished "by dropping membership in trade associations." Probably not many producers would consider this a desirable economy in these days.

Washington, D. C.: A proposed superhighway, with as many as 12 lanes of traffic through congested districts, from Boston, Mass., to Washington, D. C., would cost \$253,000,000 for the 405 miles, according to the Federal Public Roads Administration. That's better than \$625,000 per mile, which gives some idea of what such highways will mean to business in the future.

New York City: Consensus of opinion is that spiraling price increases cannot be avoided except by a firm stand on wages, which are 80% of all material and manufacturing costs. At present, only those in the armed services make personal sacrifices. Nearly every one else profits by government expenditures for defense. But the workers in defense industries do not buy the guns and war planes they make. The money they earn--the fruits of their labor--they spend for consumer goods, food, clothing, furniture, cars, radios, luxuries, etc. The more workers producing war goods; the fewer are producing consumer goods for workers, in spite of the greater demand for consumer goods. Buyers and sellers of consumer goods will observe no government fixed prices, in a market with too few goods to supply purchasers who have ready cash. In the capital goods industry not even the government can compel producers and manufacturers to produce at a loss because of inability to overcome higher prices for labor and for materials produced by labor.

Port Huron, Mich.: Natives say that Peerless Portland Cement Co. reconstruction work, now underway, involves converting two 200-foot kilns to one 400-foot kiln. It seems to be conceded more and more that long kilns are the answer to economical use of "waste" heat.

Allentown, Penn.: Negotiations are in progress between the Lehigh Valley cement companies and the United Cement, Lime and Gypsum Workers International Union, A. F. L., to prevent a threatened strike.

Chicago, Ill.: United States Gypsum Co. is being sued by the Masonite Corp. for alleged infringement of its Masonite patents on pulp board (not gypsum wall board). It is claimed U. S. G.'s Greenville, Miss., plant has been using processes conflicting with Masonite's patents for the past 6 years.

Baton Rouge, La.: A Louisiana sand and gravel company was fined \$534 including costs for violation of the state conservancy act, designed to protect hunting and fishing, because the producer's washing operations muddied a stream formerly frequented by fishermen.

Redwood City, Calif.: Pacific Portland Cement Co. is building a gypsum lath and board plant here, on the site of its portland cement works. The company has been operating a gypsum products plant at Plaster City, Imperial County, for many years.

Mankato, Minn.: Carney Co. has a new and probably large market for its natural cement. The state legislature recently approved a resolution authorizing the commissioner of highways to make extensive experiments in the use of blended cements on trunk-line highways. The blended cement will be 15 to 25 percent natural cement to 85 to 75 percent portland cement.

Spruce Pine, N. C.: Many long abandoned mica mines and quarries are being reopened, because imports of mica are being cut off--highly essential material in the electrical and radio industry.

Topeka, Kans.: Watch your scrap piles, particularly the alloy steel parts. A sand company near here had a steel shaft, pulley and attached gear stolen recently. They weren't in the scrap pile, either.

Toledo, Ohio: A group of employes of two quarry companies brought suit against the companies on behalf of themselves, individually, as representatives of other employes, and as members of a C. I. O. union. The judge ruled they had no right to sue on behalf of the union.

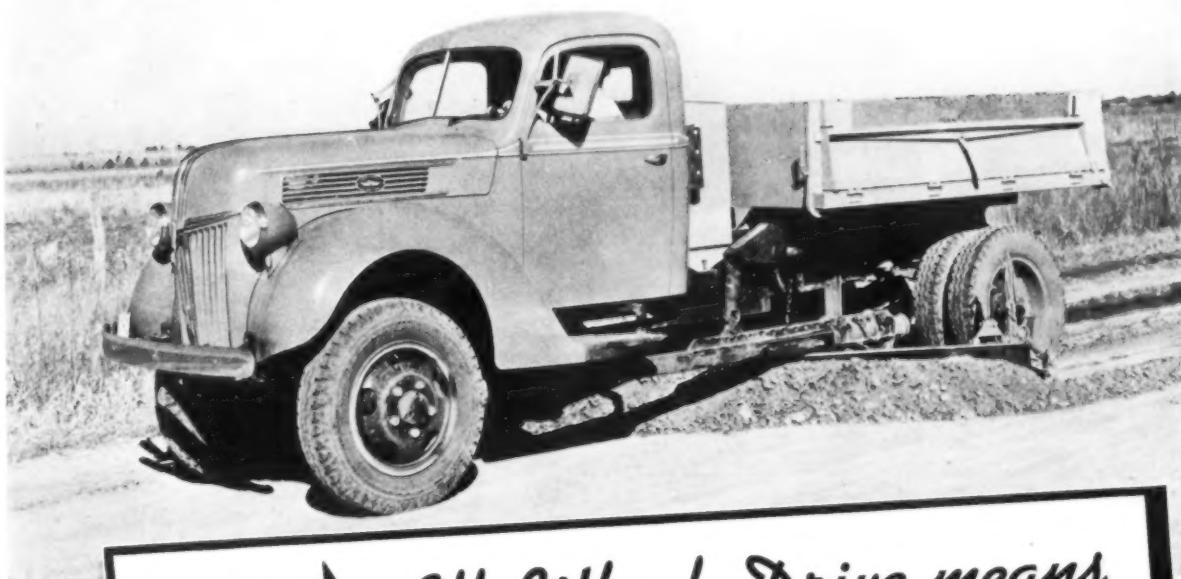
Cass County, Minn.: State A. A. A. committee has ruled to permit agricultural gypsum to be bought and distributed to farmers as a liming material.

St. Louis, Mo.: The struggle between C. I. O. and A. F. of L. unions in the building materials industries continues. The A. F. of L. is now trying to win over the C. I. O. Quarry Workers' Union members in St. Louis county crushed-stone operations. Two effective arguments are being used--promise of higher wages and boycott of C. I. O. union quarry products on A. F. of L. building trades union jobs.

Pittsburgh, Penn.: A spokesman for one of the nation's larger independent steel producers said that the order of the government freezing the prices of iron and steel at first quarter levels may force the federal government to resort to a sales or payroll tax to finance the defense program. "There were only two or three steel companies which paid surtaxes last year and this year there won't be any, that means a source of large federal taxes has been eliminated," he said.

The Staff

MARMON-HERRINGTON *All-Wheel-Drive*



➔ *All-Wheel-Drive means*
"ALL PURPOSE" *in Construction*
and Road Service . . .

Here are trucks that are never "temperamental"—never have to wait until conditions are "just right" before they go to work.

Low enough in price to operate in everyday services. Capable of doing jobs no other trucks can do.

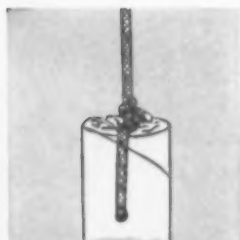
In Spring and Summer *All-Wheel-Drive* traction and power enable them to operate without stalling in mud, loose dirt and gravel and climb grades where other trucks would be helpless. In Winter they travel slippery highways with far less danger of skidding—and for snow removal they are positively unbeatable.

The increased cost of Marmon-Herrington *All-Wheel-Drive* converted Fords over standard drive trucks loses its significance in the *faster, safer trips and bigger loads* through "bad going," made possible by traction applied to the front as well as the rear wheels. Write or telegraph to address below or cable MARTON, Indianapolis, Indiana, for new "Illustrated News." It shows how to do "the impossible" in general construction, road building and maintenance, snow removal, etc., with Marmon-Herrington *All-Wheel-Drives*.

We convert all standard Ford trucks, passenger cars and commercial cars to *All-Wheel-Drive*, and build a complete line of Heavy Duty *All-Wheel-Drive* trucks, with gross capacities up to 35 tons, in our plant.



MARMON-HERRINGTON COMPANY, Inc., Indianapolis, Indiana, U. S. A.



1. Tie through cartridge.



2. Half hitch branch to main line.



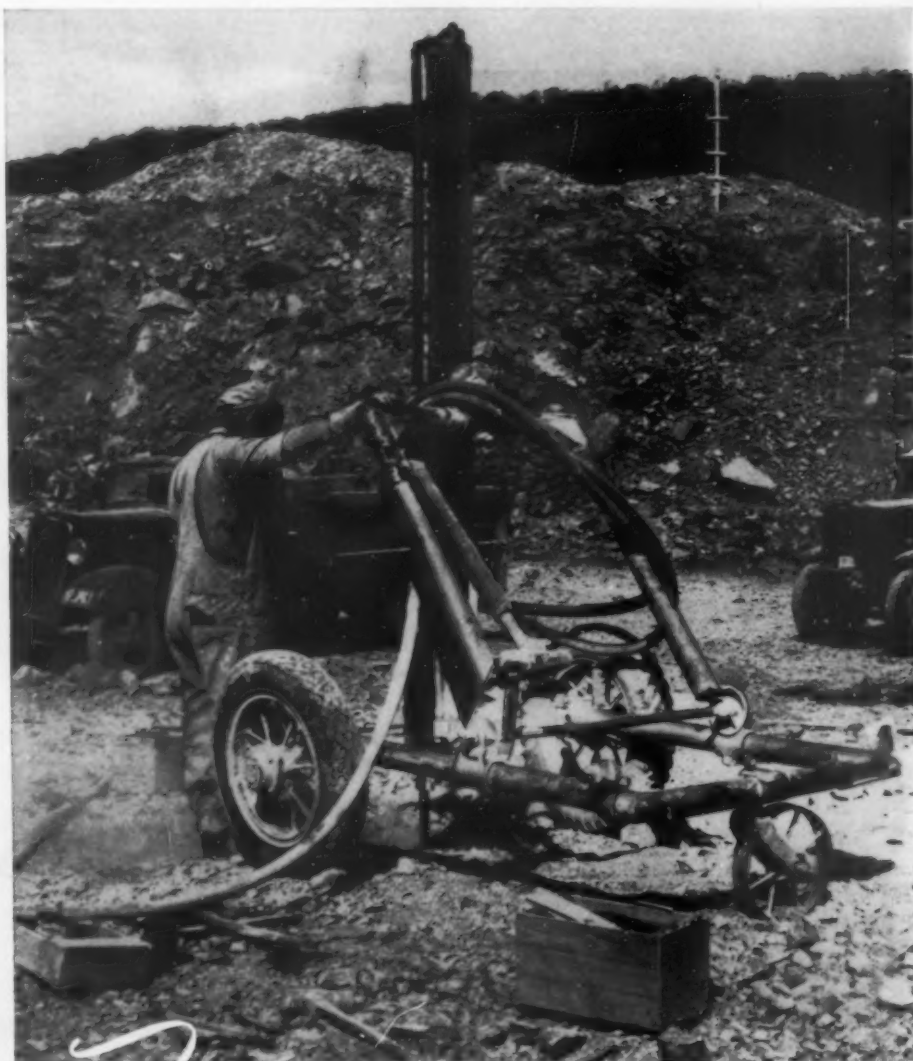
3. Connect main line lengths with square knot.



4. Fuse and cap on end of main line.

IMPORTANT

Branch lines should lead away from main lines at right angles. Avoid kinks and small loops.



For Wagon Drill Holes

Deep holes of medium size can be loaded more easily and fired more effectively when Primacord-Bickford Detonating Fuse is used. One cap on the end of the Primacord will fire one hole or a thousand. A powerful detonating wave is carried to each cartridge in the hole, *increasing its efficiency*. Primacord also connects all holes, in a rotation planned to promote better fragmentation. Light in weight, flexible, waterproof, easy to use. Write for booklet.

PB32

**PRIMACORD
BICKFORD
Detonating Fuse**

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONN.
Makers of Cordeau-Bickford Detonating Fuse—and Safety Fuse since 1836

CAN PRICE FIXING HOLD DOWN PRICES?



A DOLLAR-A-DAY INCREASE for soft-coal miners means an increase in the cost of producing coal. If there is now little or no profit in producing coal, it means an increase in the price of coal. The Federal Government wants to hold down prices; *prevent inflation*. The new office of Price Administration and Civilian Supply (Leon Henderson) decides the present legal *minimum* price of coal shall be the *maximum*. The President himself decides there must be exceptions—and exceptions are made.

The steel industry grants 10 cents an hour wage increase to nearly half a million workers, increasing the cost of making steel more than 100 million dollars, annually. But wages in the steel industry set the wage scale for countless other industries in steel-making localities. There will be increases in wages for producing fluxing limestone, slag, cement, etc. There will be increases in the cost of coal and power.

The Federal Government is now attempting to peg the price of steel. It can do so legally and possibly effectively for the steel it buys itself. It can not fix the price that other users are willing to pay for steel—in a seller's market. Some of us remember it could not successfully establish a minimum price in the N.R.A. days of a buyers' market.

Mr. Henderson proposes to control this difficulty by economic pressure—by manipulation of priorities, so that those who try to supply urgent needs of private customers at profitable prices will be penalized. All other industries are users of steel. Price increases in steel mean cost increases to them. Yet the government method meeting the situation is of ominous import to all producers and manufacturers. It implies that industry will function normally, efficiently and effectively without profits. Either that or it is a fresh attempt to destroy private industry.

The Federal Government will probably attempt to hold down all prices at the expense of profits. But the Federal Government depends on taxation of profits for a large part of its own income. So if any attempt is made to maintain Federal income, the Government must resort to higher taxes on pay rolls and the lower individual incomes—the workers' incomes. When we get all through the worker will have little gain, if any, in net income, but we shall have started price spiraling that knows no ending except in a back-to-earth crash.

Every previous experience in price-fixing proves it to be the most involved and difficult way of controlling inflation. When price fixing is begun with one commodity it must be followed through for every commodity. And when the price of the tenth or the

hundredth one is fixed, the price of the first is already out of line again. The man does not live who can treat industry equitably under such conditions.

The Federal Government possibly will not have the guts to tax small incomes more; it is too dangerous to votes; so it will itself be a victim of spiraling price increases, and Federal deficits will grow larger, not because of larger defense production, but because of higher costs and prices and less income. Such periods are marked not by greater efficiency and productiveness on the part of labor and management, but by increasing inefficiency and slacking of productiveness.

All these round-about methods and all these risks are taken why? Because the administration at Washington, and our Congress, dare not face the issue openly and honestly. They dare not face the issue of *limiting wages*. They know, and you and I know, that undoubtedly some wages are below par and should be increased. They know, and you and I know, that some wages are indefensibly high. Yet they dare not speak the truth.

The bulge in workers' incomes will not be spent for national preparedness, or national defense. It might be if workers could be induced to be thrifty and invest in United States bonds. Instead the incomes will be spent for automobiles, radios, over-stuffed furniture, etc. The supply of these will be unequal to demand. Can even the Federal Government fix a maximum price on these that will be observed?

When the shooting is over there will be enough of this sort of consumer goods in the hands of the public to last a generation, but the majority of the people won't have the means to pay rent or taxes to house them. They will have been bought at top prices and will have to be hocked at infinitesimally small prices. And the people will howl against a government that let them down!

Most of this confusion is caused by the mistaken idea that the scale of living is determined by the *amount* of money that goes through a man's pocket. The actual test, of course, is what amount of material necessities, comforts and luxuries he can exchange his daily work for. Increasing the amount of money in his pocket does not add to his real income in times of spiraling prices, because his income never can keep up with price increases—in the things he buys, if not what his government buys.

Nathan C. Rockwood

NEWS AND COMMENT

Federal Helpfulness

PRODUCERS OF AGRICULTURAL LIMESTONE for the A.A.A. soil conservation program, where sales are made direct



to a federal government agency are in a quandary over their liabilities under the Walsh-Healey public contracts act. The act does not apply to purchases of less than \$10,000. The A.A.A. does not make contracts for specific amounts. It contracts and expects to get as much as it wants at a predetermined price. If the orders run over \$10,000 in a season, it can be contended that the producer was subject to the Walsh-Healey Act. If they don't he wasn't. We have known other federal government departments, which wanted to buy expeditiously, to break up a large order into less than \$10,000 lots in order that they might avoid the Walsh-Healey Act. We understand, however, that the A.A.A. takes a different point of view, being presumably more genuinely New Deal. The rub comes from the fact that a producer may be complying with the Wages and Hours Act and violating the Walsh-Healey Act. The Wages and Hours Act merely insists on overtime wages after 40 hours a week. A producer may operate four 10-hour days, as he probably does, frequently, on account of wet weather, and not pay over-time. Under the Walsh-Healey Act he is not permitted to operate over 8 hours a day without payment of over-time. His four 10-hour days would mean 8 hours over-time. Moreover, if he is not shipping out of the state he does not come under the Wages and Hours Act; but he is under the Walsh-Healey, regardless.

Mexico's Cement Project

CEMENTOS GUADALAJARA, S. A., has been recently organized with a capital of \$1,600,000 Mexican currency, for the building of a plant at Guadalajara, State of Jalisco, Mexico. The new company will erect a two-kiln plant, and will produce special and masonry cements under license from the Cement Process Corporation, New York.

Alton J. Blank, executive vice-president of Cementos Atoyac, S. A., and chemical director of the Cement Process Corporation, with Charles C. Jagou, consulting engineer of Cement Process Corporation, have contracted with Cementos Guadalajara, S. A., to design, erect, and supervise the operations of the Guadalajara plant. W. B. Williams, formerly chief engineer, of Cementos Atoyac, S. A., will be chief engineer in charge of construction of the new plant. This is the first new cement company to be organized in Mexico for a number of years, and it is expected that the plant will be in operation early in 1942. It will be the second cement company in Mexico to produce special cements exclusively under the Blank process.

Typical Assumptions!

YOU GUESSED IT long ago; and so did we! President Roosevelt, according to Mark Sullivan, well known newspaper



columnist, keeps a kind of index of money actually spent (as distinct from money appropriated) as a measure of defense activity. The President notes gleefully the rising trend of expenditure. It would seem that expenditures might increase along with increasing incompetency and inefficiency, as well as with greater production. How fortunate is the man who can see only the foliage in this tree of industry!

Grinding Pebbles

SUPPLEMENTING a recent U. S. Bureau of Mines Information Circular (No. 7139) on "Grinding Pebbles and Tube-Mill Liners," the Bureau says: "The Canadian Mining and Metallurgical Bulletin for September, 1940, reported that large American consumers were becoming interested in several southwestern Saskatchewan deposits that contain a hard, dense, quartzite pebble that compares very favorably with the material formerly imported from Europe. Deposits in the best locations already have been taken up, and the Canadian Flint & Spar Co. was beginning production at Gouverneur and Knolly immediately."

No Principle Lost

NOTWITHSTANDING labor union officials' claims of establishing "union security," Max W. Babb, president of Allis-Chalmers Manufacturing Co., says: "The settlement agreement makes it clear that no man's job shall be dependent on union membership—the principal point on which the company has insisted throughout the long controversy. The tragedy of this strike is emphasized by the fact there is nothing in the settlement agreement which the company was not willing to grant before the strike. . . . We are happy to reach this conclusion to the controversy on a basis which insures that the management will retain proper control of production in the plant. We feel certain that production for national defense and for our other customers, as well as the interests of our workers and stockholders will be fully protected under this new agreement."

WM. S. KNUDSEN, director general, O.P.M., commenting on the Allis-Chalmers strike, said: "The strike after starting out as a closed shop strike wound up as a union security strike after a lot of confusion in wording a so-called referee clause which, to say the least, was ambiguous."

"The conciliation service of the Labor Department, the O.P.M., and the union tried for two months to find a way of settling the argument, only to find at last that the original strike was fraudulent."

"A thing like this is very hard to deal with. The fact that the strike vote was fraudulent was gone over lightly. The fact that a large number of men came back to work in support of the defense job was given no consideration."

Worried Producers

ONE DIVISION of building material costs on the Coast, and particularly in California, which has not risen



since war and the spectres of inflationary trend made their appearance in economic affairs, is cement," says the Pacific Coast Edition of the Wall Street Journal, which continues: There is plenty of statis-

tical evidence that quite the contrary direction has been taken without even present assurance of price stability.

While this has been good for the builders in general, it has been anything but beneficial to the mills which, at this time, are operating at the highest rate in their history in California, and have again begun to pick up production in the Pacific Northwest after filling the tremendous Grand Coulee Dam requirements.

California has two or three big jobs in progress just now, notably Shasta and Friant dams, but the fact about these, so far as the general industry is concerned, is that they have added nothing to the old established mill load since a new mill was set up on the basis of these contracts alone and is furnishing the whole supply.

It is now indicated that cement production in California for the first quarter rose a full 40 percent above the first quarter of 1940 reaching probably 3,300,000 bbl. including cement for Shasta and Friant. Shipments at the same time were heavy.

Although reported by the Bureau of Mines in two divisions, one for California and one for Oregon and Washington, there are really three cement shipping zones on the Coast, mills supplying Northern and Southern California having only a limited zone of overlapping competition.

Taking California as a whole, as is done by the Bureau of Mines, however, the fact is that the average mill value of cement has lately dropped below \$1.25 a bbl., whereas up to late 1938 it had ranged around \$1.50.

In the Pacific Northwest, notwithstanding the big Columbia River works, the average mill price of cement has not gone below an average of \$1.63 in any quarter in recent years and began this year around \$1.80.

Electrostatic Separation

AMERICAN AGRICULTURAL CHEMICAL Co., Pierce, Fla., plant has in operation the first installation on a commercial scale for electrostatic concentration of phosphate rock. The operation is described by Herbert Banks Johnson, vice-president of the Ritter Products Corporation in the March issue of *Engineering and Mining Journal*. In this process the mineral particles in a static electric field of high potential electricity are positively or negatively charged according to their character. They can then be separated somewhat as in magnetic separation. The process can be made to compete with the froth flotation process, and quite possibly will

find its way into processing raw materials for portland cement manufacture.

Won't Disband Union

DIAMOND ALKALI Co., and its subsidiary, Standard Portland Cement Co., Painesville, Ohio, have notified the National Labor Relations Board that they did not intend to comply with the board's recent order to disestablish the Alkali Employees' Federation, Inc., a union incorporated under the laws of Ohio.

"Twofors" Going Out!

THEY SAY one of the best indexes of prosperity of the common man is his taste in cigars. During the brief uplift in 1937, a slight trend was noted for better grades. Now there is a pronounced trend away from "twofors", to nickel and three-for-ten grades.

The Federal Government has a close check on men's tastes in cigars, for taxes are graduated according to sales prices. Well, most of us are glad to witness this change—if it does not usher in another silk-shirt era!

The trouble with attempting to control inflation by taxing prices is that the workmen will want increases sufficient to pay the tax. It won't take 'em long to learn that their net wages will be less—less because of taxes, less because of higher prices. The "twofors" will still be "twofors" in quality, but their price will be 5c each.

Blue Monday

MONDAY is not only a "blue" day for the women in the family who are faced with the problem of the weekly wash, but carries over into industry, too, according to Dr. Victor G. Helser.

One big company which made an analysis found that more industrial accidents occurred on Monday than on any other day. The casualty rate declined until Thursday, when it jumped higher again, and Friday turned out to be the safest day of all.

It should be interesting to check this with one's own experience.

Introducing "Super Dan"

WITH THIS ISSUE we introduce a character we propose to carry through a series of monthly adventures—Superintendent Dan, or "Super Dan," for short. He is purely an imaginary character, created by the joint cerebral emanations of ye editor and our staff artist, Tom Racki. Any resemblance of Super Dan to a human animal dead or alive, or any fictitious character anywhere, any time, is purely accidental.

Now then, dear reader, while we have some incidents to which Super Dan is designed to submit, we are asking you for suggestions, wisecracks, etc., etc., based on your own experience, or things you have observed. For all that are accepted and published we offer to pay \$5 for each and we'll give you full credit in a by line.

—N. C. R.

ADVENTURES OF SUPER DAN, THE SUPERMAN



Hints and Helps

★ FOR SUPERINTENDENTS ★

Traveling Desander

ANDERSON SAND AND GRAVEL CO., Rockford, Ill., has developed some unusual equipment to desand stockpiled or pit run material before it is transported to the plant. The

over a grizzly which rejects plus 6-in. boulders. From the bottom of the hopper, the material is elevated up the inclined belt conveyor, about 30 ft. centers, to a double-deck Robins vibrating screen. This



Portable desander equipment removes excess sand in material before it reaches plant for processing

equipment is shown in the illustration.

At times the demand runs strongly to gravel and to secure maximum production in the plant it is desirable to reduce the percentage of sand in the pit run material before running it through the plant. The desander has done an excellent job in solving this problem.

Mount Equipment on Rails

The equipment includes a steel hopper mounted on flanged steel wheels for movement over standard gage trackage on the pit floor, an inclined conveyor belt from the bottom of this hopper to a steel frame tower on a short flat car, a double-deck vibrating screen mounted over a bin on the flat car, a boom conveyor at right angles to the car to carry away the sand, and a third boom conveyor projecting from the end of the flat car which moves the gravel into a car or trucks for haulage to the plant.

Material excavated from the pit by shovel is dumped into the hopper

screen has 1-in. openings on the top deck and $\frac{3}{4}$ -in. openings on the bottom deck. The top deck serves principally as a wearing and shock-absorbing surface. Throughs from the bottom deck are chuted to the bottom of the bin, and are removed to

waste by the boom conveyor projecting at right angles from the flat car, about 20-ft. centers. The over-size gravel goes to the belt conveyor, 30-ft. centers, into a car which transports material to the plant. It will be noticed that the first conveyor from the hopper is reinforced with a stiffening truss. The conveyor projecting from the end of the flat car has a lattice truss support which may be raised and lowered by steel cables running across the top of an A-frame by means of a winch.

The use of this portable desanding equipment has made it possible to step up screening capacity when gravel demand is heavy.

Bin-Loading Device to Save Time

BLUE RIDGE STONE CORP., Blue Ridge, Va., has developed a chute for loading trucks from stone bins that is both a time- and labor-saver for the truckdriver. It is a moveable chute that makes it unnecessary for the driver to "re-spot" his truck to load it uniformly from the front end to the back.

The arrangement consists of a Ford brake drum mounted on the bin support, as shown, and a counterweight attached to the stone chute by cable to balance the weight of the chute.

Clearance under the bins is such that the chute can be lowered, as it is allowed to swing in a vertical plane from a pivot at its top end, and still clear the truck body.

In operation, the truck is spotted so that the discharge end of the chute traverses the length of the truck body as it is allowed to swing. By pulling a cord the brake is released and a very slight effort raises or lowers the counterweight to raise or lower the chute.



Device for quickly loading trucks. Left: Brake drum and counterweight control lowering and swinging of chute. Right: Loading truck through the chute

Cut Stockpiling Costs

HENRY J. KAISER CO., Pleasanton, Calif., has built a large tripper or stacker over a 36-in. conveyor to simplify, speed up and cut costs in stock piling operations. This unusual machine, shown in the illustration, is built on two railroad car trucks which ride on two tracks, one on each side of the conveyor. Materials can be stored on either side of the conveyor at any location up to 1500 ft. from the plant.

The stacker boom conveyor is 100 ft. long and is mounted on a revolving turntable which is powered by an electric motor. The mobile power is a variable speed motor. All of the superstructure and boom is of arc welded construction. An old shovel bed was used for the turntable. The center pin, swing mechanism, controls and boom hoist are all utilized.

O. M. Mikkelsen, shop foreman of the company, submitted the data and illustrations concerning this equipment to the James F. Lincoln Arc Welding Foundation for one of the awards in the contest on latest advances in welding.

Preventing Breakage in Storage

ARUNDEL CORP., Baltimore, Md., uses the type of stone ladder illustrated to place gravel into open bins at its new sand and gravel plant. The purpose is to prevent breakage



Two views of stone ladder used to prevent breakage in filling bins

in filling the bins, segregation being relatively unimportant since gravel is sized within close limits in four fractions at this plant.

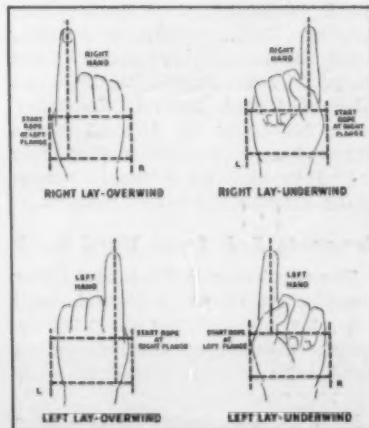


Stockpiling stacker which takes material from a belt conveyor and transfers it by means of a swiveling boom conveyor to piles on either side of the parallel tracks on which the stacker rides

The stone ladder is used at the Arundel Corporation's new Linthicum plant, which was described in detail in the April issue of *Rock Products*.

Drum Reeving Simplified

PROPER APPLICATION of cables to shovel drums is an important factor in increasing cable life. The follow-



Illustrations showing how various types of wire rope are started on drum

ing method of roping a smooth drum is described by one of the cable manufacturers:

There is a rule, a rather complicated one, that tells at which drum flange to start roping a smooth drum. If started at the proper flange the rope will wind with the wraps tightly hugging each other. It will so wind itself on the drum that there will be no space between wraps into which a wrap from the layer above might squeeze and cause serious scrubbing, scarfing or binding. If a rope is not to damage itself prematurely the wraps must lie close together.

To reduce the tendency for rope

to spool unevenly, many users are employing the preformed type. One result of "preforming" is to make the rope resist rotating when passing over drums and sheaves. However, regardless of the type of rope used, all ropes should be properly started on the drum. Here's the rule:

When a right-lay rope is being underwound on the drum (which is to say, it leads from the bottom of the drum) start it from the right flange, looking at the drum from the rear. If a left-lay rope, start it from the left flange. Conversely, if a right-lay rope is being overwound (that is, it leads from the top of the drum) start it from the left flange. If a left-lay rope (overwound) start it from the right flange.

It is a complicated rule to remember, and more frequently than not quick reference to it is not available at the machine. A far simpler rule is to use your doubled-up fist to represent the drum, and the index finger to indicate the flange. With right-lay rope use the right fist. With left-lay rope use the left fist. For overwound rope keep your fist back up. For underwound rope, palm up. Pointed to the drum the index finger will indicate both how the rope should lead from the drum and from which flange. The accompanying illustrations show how easily this rule may be applied.

Formula Error

ON PAGE 28 of the March issue of *Rock Products* there appeared an article by W. F. Schaphorst on Computing the Length of Cross Belts. This formula contained a typographical error, and should have been as follows:

$$L = \pi(R+r) + 2(R+r)^2 + \frac{L}{2\sqrt{L^2 - (R+r)^2}}$$

Crush Tunnel Rock for



Looking toward primary crusher house from top of main screening plant. Note fume suspended below conveyor gallery

Rock excavated from Delaware Aqueduct was processed in specially built crushing and washing plant into concrete aggregates and then returned as concrete for use in lining tunnel

PLANTS PRODUCING AGGREGATES for the Board of Water Supply, City of New York, had to meet exacting specifications. Coarse aggregates were either crushed stone or gravel, and natural sand was the only fine aggregate allowed. Not only must the source of the materials be approved but the plants and processing had to satisfy the Water Board engineers.

Along with stiff limitations on deleterious content in concrete sand, the specifications restricted the percentage of extreme fines, those below 100-mesh, which are so much desired in some federal specifications. This limitation was intended to hold down clay and silts. Plasticity was maintained by requiring a high percentage of fines between 50-mesh and 100-mesh.

Coarse aggregates had to be insoluble, and limestone and other carbonates were forbidden. Coarse aggregate was demanded in two sizes: $1\frac{1}{2}$ to $\frac{3}{4}$ -in. and $\frac{3}{4}$ -in. to $\frac{1}{4}$ -in.

Seaboard Construction Corp., Mt. Kisco, N. Y., contractor for the construction of section 323 of the Aque-

duct, embracing 30,600 ft. of 14-ft. tunnel, 500 ft. below the surface and reached through shafts, built a modern crushing and washing plant near Katona, N. Y., to crush and grade rock excavated from the tunnel. The plant, designed by J. C. Buckbee, Los Angeles, Calif., consulting engineer for Seaboard, produced about 125,000 cu. yd. of stone from June, 1940, until it was shut down in December, 1940. Stockpiles of finished coarse aggregates were built during this period to care for concrete tunnel lining through the winter months.

Separate Soft from Hard Rock

The requirements for tunnel lining were for 400 cu. yd. of concrete each 8-hr. day, necessitating about 360 cu. yd. of coarse aggregate. The crushing plant had a capacity of approximately 120 tons per hour.

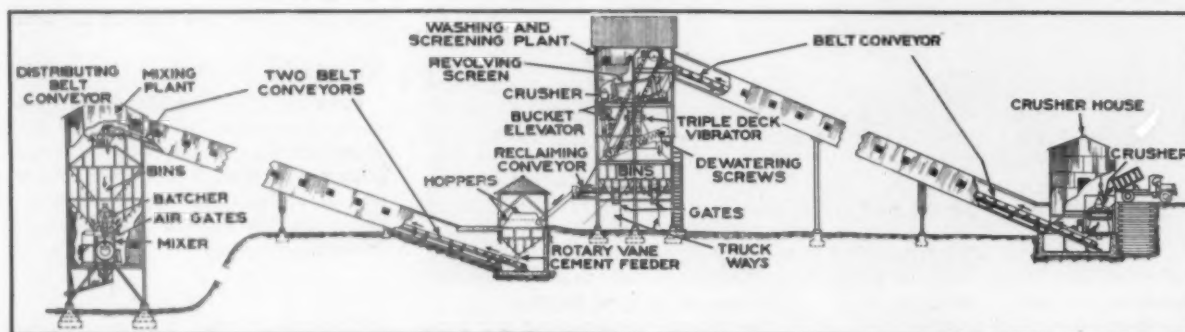
Most of the tunnel rock was a highly siliceous Fordham gneiss that

is very hard and tough. Where intrusions of undesirable rock, such as crystalline limestone, mica-bearing rock, and schists occurred, these materials were sent to waste piles. The Fordham gneiss was stored in piles and later crushed to produce the necessary coarse aggregate.

Rock coming from tunnel excavation always carries foreign materials, objectionable and harmful to the operation of a stone crushing plant, and these had to be guarded against. They included timber from broken ties, blocks from tunnel supports, bolts, nuts, spikes, drill steel ends, dipper teeth from muckers, sledge hammers, etc. Such material necessarily had to be removed prior to crushing.

The plant itself was of simple design. Tunnel rock was hauled from the storage piles on 6 cu. yd. dump trucks to a No. 8 Gates K primary crusher. This crusher discharged on to a 30-in. inclined belt conveyor, 250-ft. centers, which transported the crusher throughs to a 5- x 15-ft. combined washer and scalping screen at the head of the main plant. Pickers

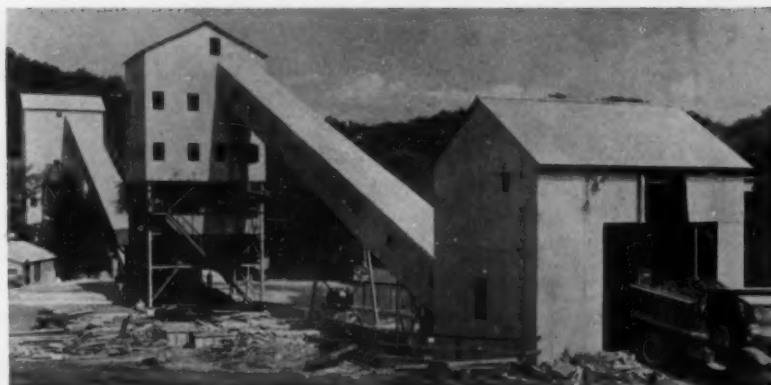
Showing location of crushing, screening and washing equipment, indicating flow of material through plant



Aggregates

were stationed on the belt near the crusher discharge and part way up the conveyor who removed the wood and larger metal. Dust from the No. 8 crusher discharge was drawn from the conveyor housing by a 16-in. Koppus fan. Magnetic materials were removed by a 32- x 42-in. Stearns magnetic pulley at the head of the 30-in. belt conveyor, previously mentioned. The No. 8 Gates K crusher was set to produce about 4-in. rock, and at the head of the plant this product was first washed and then separated by the 5-ft. scalping screen into plus 2-in. and minus 2-in. material, the oversize going to a 7-in. Newhouse gyratory reduction crusher. The product of the latter crusher was then elevated back to the scalping screen by a belt bucket elevator. The minus 2-in. material dropped to a 4- x 12-ft. Stephens-Adamson, triple-deck vibrating screen which produced 1½ to ¾-in., ¾ to ½-in., and minus ½-in. rock. A safety switch, in circuit with the reduction crusher drive, was another precaution against the danger of tramp steel damaging the crusher. The minus ½-in. rock was dewatered by a 20-in. twin inclined screw washer.

Finished rock was stored in four steel bins having a total capacity of 500 tons, from which it was withdrawn to trucks for stockpiling or was conveyed over by a 30-in. belt conveyor to the 24-in. inclined belt con-



General view of plant showing truck dumping into primary crusher, conveyor leading to screening plant, and to the rear, the concrete mixing plant

veyor leading to the head of the concrete mixing plant.

Minus ¼-in. rock was not permitted by the specification, and had to be disposed of. Some was used for levelling off and finishing the jobsite, and part of it was sold to concrete products plants and for driveways.

Concrete Handling Methods

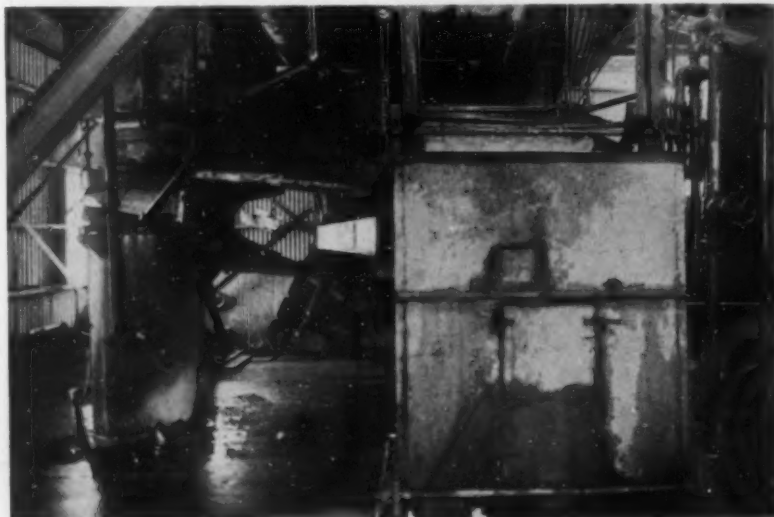
Natural sand, for concrete, was purchased from the Colonial Sand and Gravel Co., and dumped from their trucks into a hopper feeding a 24-in. belt conveyor, 250-ft. centers, leading to the concrete mixing plant. This belt also handled the coarse aggregate.

Bulk cement from trucks was taken to the top of the mixing plant by a 20-in. belt conveyor, 250-ft. centers. Concrete was mixed by two 2-cu. yd. Smith tilting mixers and carried vertically through a 10-in. pipe to a hopper at the tunnel level where

Blaw-Knox "Agitators" of 5-cu. yd. capacity were used to haul the concrete underground to the point of placing in the aqueduct tunnel.



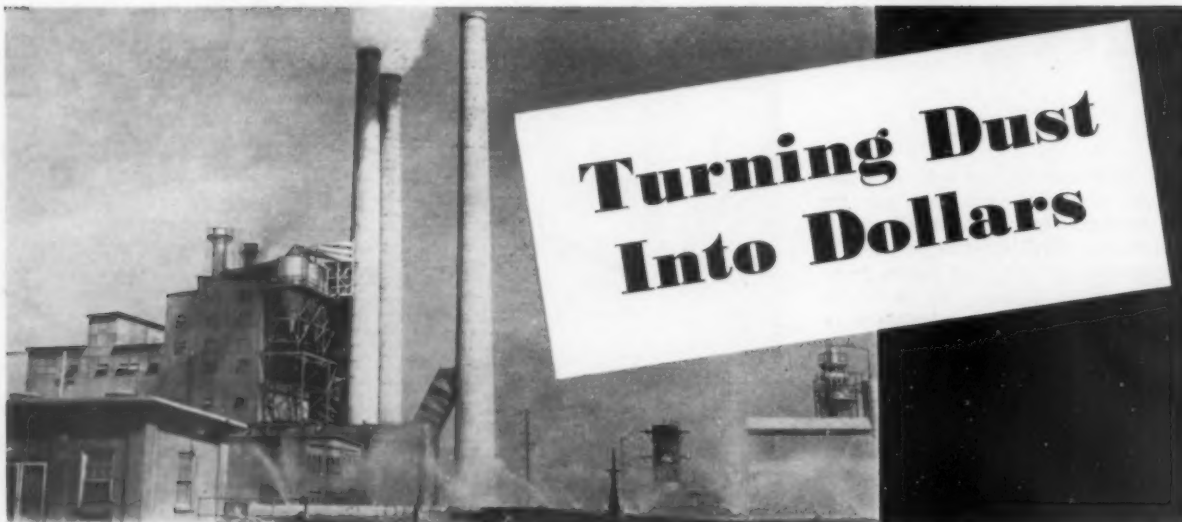
Close-up of screening plant during the winter showing concrete batching plant in the rear



To the left, in the background, is the gyratory reduction crusher. Throughs are elevated back to scalping screen and then chuted to triple-deck vibrating screen, to the right, for sizing

All the plant structures were furnished by Bethlehem Steel Co. Allis-Chalmers provided the crushers; General Electric Co., the motors; Hewitt Rubber Co., the belting; and Stephens-Adamson Co., the screening, elevating, and conveying machinery.

The Seaboard Construction Corp. built this plant of steel construction so that it may be easily erected and dismantled as soon as the project for which it was constructed has been completed. With a number of large defense projects under way which may require the erection of a crushed stone plant near the site of the work, a study of this plant's arrangement may be of timely value. The particular job for which this plant was constructed has been completed and the plant may now be dismantled for use at another location.



General view of Oklahoma Portland Cement Co. plant at Ada, Okla. Note dust collectors, upper left, and pipe connections

Efficient methods employed to intimately mix recovered dust with slurry cake feed to kilns

TURNING DUST into dollars is the way one may refer to the economies of the dust recovery system recently installed at the Ada, Okla., plant of the Oklahoma Portland Cement Co.

This is a wet process plant, consisting of three kilns, two of which are in active service and the other in reserve. The kiln in reserve, set off from the others, was originally designed for the recovery of potash during the last World War when prices made it economical to recover

By RALPH S. TORGERSON

this product. It has been used in recent years in the manufacture of masonry cement. The other two kilns in active service operate with natural gas fuel in connection with two B. & W. Sterling waste heat boilers rated at 1200 hp. each, but the power output of course varies with the kiln temperatures. All kilns are natural-gas fired.

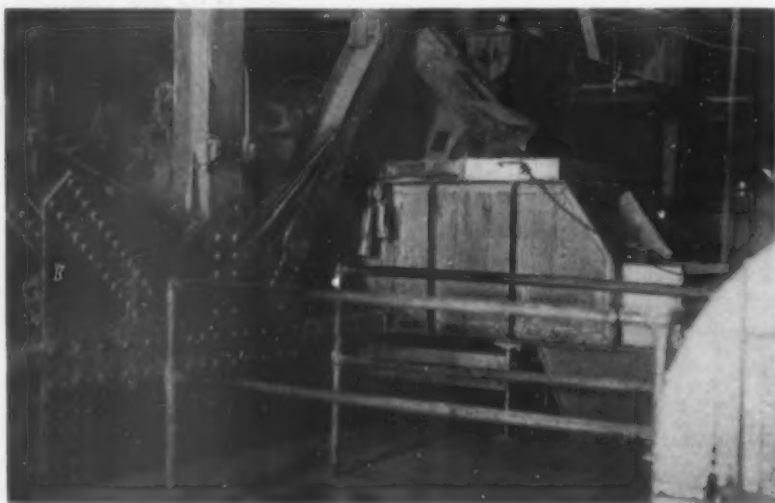
Prior to the installation of the six

Norblo dust collectors, the gases from the kiln passed through the waste heat boilers and then through the two short waste heat boiler stacks, shown to the left in the illustration. At that time the large concrete stacks were not used, but they are now connected by ducts with the dust collectors.

After the dust collectors were installed, the waste heat boiler stacks were blocked off with dampers and the gases carried in ducts, which may be seen on the roof, to the new all-metal type H.E.L.S. Norblo collectors. To these collectors, each kiln fan delivers 75,000 cu. ft. of gas per minute at 305 deg. F. The static drop through the collector is approximately one inch water gauge. Overall efficiency, according to field tests, is 80 percent or better with particle sizes ranging as follows: 34 percent, 7½ microns; 99 percent, 60 microns.

Collected dust is carried by a 9-in. screw conveyor from the collectors to a cross screw conveyor. This second conveyor, which slopes upward, empties into a chute which distributes the dust to bins. Beneath the dust bins another screw conveyor carries the dust to a chute feeding a pug mill of the paddle type which was made by the company for this work. The two pug mills, one for each kiln, are directly below the floor on which the slurry filters are operating. The slurry cake is chuted to a short belt

(Continued on page 34)



Pug mill which mixes dust from stack collector and blow down dust from waste heat boilers with slurry filter cake. To left behind girders is conveyor feeding slurry cake and above the mill is the screw conveyor feeding dust and the chute feeding blow down dust

Air-Conditioning Clinker

Penn-Dixie's clinker cooler installation results in fuel economies, improved grindability, and lower autoclave expansion

AIR-QUENCHING CLINKER COOLERS continue to hold the attention of cement manufacturers as one of the principal types of mill improvements now being made. Fuel economy, improved clinker grindability, lower autoclave expansions, and immediate availability of clinker for grinding are the principal reasons why clinker coolers are being adopted.

For the last one and one-half years, the Pennsylvania Dixie Cement Corporation has had in operation a Fuller Company inclined grate clinker cooler on each of three 9- x 125-ft. kilns at its Bath, Penn., plant.

Penn-Dixie's Bath plant is dry process and manufactures all types of special portland cements, including the entire range of dark cements, high-early-strength cement, some regular portland and the Merriman Specification cement for the Board of Water Supply of the City of New York.

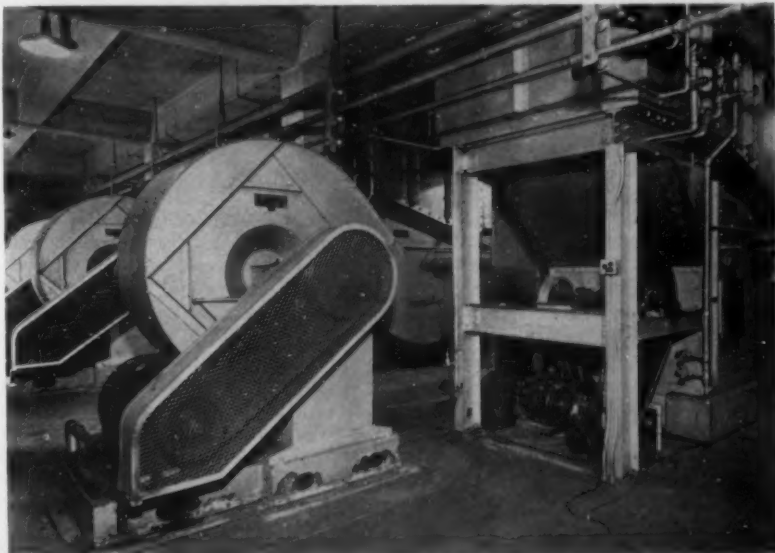
The manufacture of Merriman cement was also a vital factor in expediting the installation of clinker

coolers. This specification prohibits the application of water to cement clinker after it has cooled below a dull red and limits the loss on ignition to 0.9 per cent. Earlier practice at this plant was to spray the hot clinker with water before storing. In connection with this specification's restrictions prohibiting water in con-

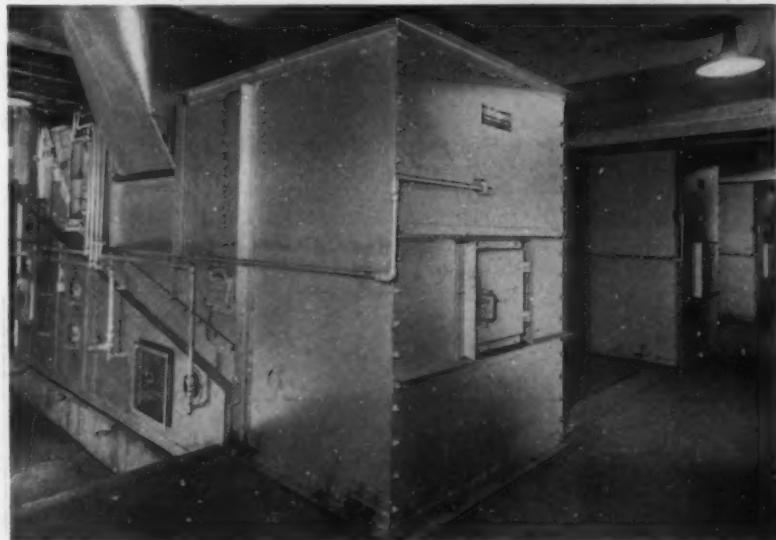
tact with cool clinker, the clinker storage area of 150,000 bbl. capacity has been partially covered with a ZD monolithic concrete barrel roof, both sides of this area also being enclosed.

Advantages of Clinker Coolers

Clinker conditioning by sudden cooling with a blast of air is not so



Above: Showing fans and three clinker coolers which have improved grindability of clinker and saved on fuel



Below: Discharge ends of three clinker coolers. Kilns are overhead and the drag conveyor for taking the clinker to storage is underneath

important an advantage of the new coolers in this particular plant since magnesia content in the clinker is reasonably low. Nevertheless, expansion in the autoclave cement soundness test has been lowered somewhat. It is known that the clinker grindability has improved but the production of an increasing tonnage of special cements requiring higher finenesses has offset this gain. Also four kilns in this plant are still not equipped to cool clinker except by long time cooling in storage. Most of the cement is ground from a mixture of air quenched and "storage cooled" clinker.

Each of the kilns equipped with



New stainless steel kiln hoods which were installed in connection with the clinker coolers on the floor below. On the left is shown the aspirator which determines the secondary air temperature. Air withdrawn by hand valve passes through thermocouple for registering on panel

clinker coolers has an output of $37\frac{1}{2}$ bbl. of clinker per hour which discharges from the kiln through a vertical chute onto the inclined grate of the cooler. The coolers have a 4- x 20½-ft. grate surface and are installed directly below the kiln hoods. They are of the combined primary-secondary cooling type with the plenum chamber below the grates divided into two compartments. Fixed grates are alternated with reciprocating grates to move a uniform bed of clinker the length of the cooler, with air forced through the bed of clinker due to the pressure maintained in the plenum chambers.

A No. 33 Clarage fan, V-belt driven off a 50 hp. constant-speed electric motor, having an average power input of 38.5 hp., supplies the air for each cooler through ducts entering below the grates. Air volume is regulated by means of louver dampers.

Clinker coming off each cooler is handled by a common drag conveyor to a bucket elevator which places it into the storage area. An overhead crane is the means of blending and reclaiming clinker from storage to the grinding mill.

Construct New Kiln Hoods

In any installation of this type, it is desirable to burn as close as is practicable to the point of discharge from the kiln. This required some changes in the kiln and firing arrangement. The kilns are fired with pulverized coal. New kiln hoods were built, and stainless steel castings were used on the discharge ends of the kiln

where very high temperatures prevail. A water-cooled burner pipe was also installed.

About 25 per cent of the combustion air is primary air introduced at room temperature, and the remainder, secondary air, is from the primary or hot end of the cooler and enters the kiln at about 1000 deg. F. Clinker enters the cooler about 2500 deg. F. and is discharged at 100 deg. F., an average figure including the larger pieces up to 2-in. size. Excluding the larger pieces, the temperature is dropped much lower and can be held in the hand with very little sensation of warmth.

Change Cooler Operation for Different Cements

Bed thickness with these temperatures and capacities will usually run from four to five inches. By means of a Reeves variable speed drive, the grate speed is changed to maintain a constant resistance to the passage of air forced through the clinker bed, and therefore a uniform flow of air. Recording pyrometers which measure the temperature of the air entering the waste heat boilers quickly inform

the operator of an air deficiency or an excess of coal entering the kilns.

Fans deliver to each cooler an average of 16,600 c.f.m. of air (70 deg. F.) of which the average volume delivered to the kiln as secondary air is 6000 c.f.m. The rest, which is used for after-cooling, is wasted through an insulated stack at 200 to 260 deg. F. An aspirator at each kiln hood is used on occasion, to draw out secondary air past a thermocouple for a temperature reading.

These kilns are fired with a 14,000 B.t.u. West Virginia coal. Coal consumption, since the coolers have been operating, has been reduced approximately 5 lb. to a barrel of cement. Air pulled in by the fans is taken direct from the room, where the coolers are installed with the result that this room is just about the coolest place that can be found in the entire plant.

Cement Industry in Argentina

THE ARGENTINE CEMENT INDUSTRY was insignificant before 1914 but the shortage of supply and excessive prices of the 1916-1918 period led to the establishment of a domestic cement industry, states the U. S. Bureau of Mines. Cement prices were said to have been 348 percent higher during the world war days than in 1913. Today Argentina has 13 cement plants with a total capacity of 2,144,000 metric tons. The report goes into some detail in describing the raw materials and the operation of the most important plants.

Imports, production and consumption of cement in Argentina for the years 1935-1939 in metric tons was as given in the table below.

Since production capacity has been increased at a much more rapid rate than consumption, and is now about double the tonnage sold, the competitive situation is not considered a healthy one for the industry. Unless there is a large demand for its use in new public works construction, the report states that the future policy of the industry will have to be one of production control or the dumping of surpluses on foreign markets.

Year	Imports from United States	Total Imports	Production	Consumption	Per-capita consumption, bbl. (376 lb.)
1935	3,993	35,065	721,829	756,629	0.35
1936	4,497	27,646	833,631	861,277	.40
1937	4,920	109,862	1,035,495	1,145,357	.53
1938	6,132	74,931	1,100,706	1,235,637	.58
1939	3,452	19,975	1,050,000	1,069,975	.50
*Production plus imports					

Impact Crushing For Better Gravel

Iron City Sand and Gravel Co. improves gravel quality by breaking down any soft material which is scalped out by screening

PITTSBURGH sand and gravel producers have invested thousands of dollars in equipment within the past year to increase the quality of the aggregates. Some machinery has been purchased to improve the grading of concrete sand by increasing the fines, but most of the expenditure has been for the removal of soft particles in gravel. Pennsylvania limits the loss on the Los Angeles rattler test to 35 percent in 500 revolutions.

All the sand and gravel is dredged from either the Ohio, Monongahela or Allegheny Rivers. Conditions vary in different parts of the river beds, but all the big producers have put into operation impact-type crushers to break down any soft material and thereby improve quality.

In most cases, installation of these crushers has been accomplished easily as just another step in the flowsheet. Iron City Sand and Gravel Co.'s plant at 22nd Street and the Monongahela River in Pittsburgh is typical.

Regulated Feed and Speeds Controls Product

This company, which has been in business since 1892, started producing crushed gravel in 1929. The plant under consideration is one of Iron City's retail plants in the Pittsburgh area which receive and further process aggregates dredged from the Ohio River.

Ohio River gravel is about 90 percent sandstone with 10 percent feld-



Oversize from 4- x 10-ft. vibrating screen goes back to impact crusher, and throughs go to screening plant

spar and granite. A soft sandstone is the material in question. The Monongahela plant with a rated capacity of 140 tons per hour comprises a jaw crusher, vibrating sizing screens and bins. Barge loads of gravel, ranging in size from $\frac{5}{8}$ -in. up to $3\frac{1}{2}$ -in., are brought to this plant, and a stiff-leg derrick-operated clamshell fills a hopper.

This hopper is set over a 42-in. Stedman impact-type crusher which



Gravel is fed by a reciprocating feeder to 42-in. impact crusher. In the chute over the feeder are six gates in a row so arranged that any part of the stream may be by-passed the crusher. Return belt conveyor is shown to the left

is fed gravel by a reciprocating feeder.

Best results have been obtained by feeding the rounded gravel so that in operation the impact machine produces a minimum amount of crushed particles. In other words, no attempt is made to crush more than the 40 percent crushed gravel specified for Pennsylvania concrete highway construction.

In the chute over the crusher are six gates in a row so arranged that any part of the stream may be bypassed the crusher to join the crusher product for screening. The important sizes produced are a 1/4- to 1-in. product and one from 1- to 2-in., with the Los Angeles rattler test applying only to gravel between 1/2- and 1 1/2-in.

The crusher turns at either of three speeds, 321 r.p.m., 425 r.p.m. and 535 r.p.m., and is V-belted to a 75-hp. electric motor, having an over-capacity. From the standpoint of soundness test and wear, better results were obtained with the medium speed which also produces a maximum of sizes desired. Speed changes are also a means of regulating the percentages of crushed gravel.

Crushed and by-passed gravel join on a 24-in. Kennedy-Van Saun belt conveyor, 57-ft. centers, and the throughs are elevated to the screening plant for separation into sizes. The oversizes are carried back to the crusher on a Barber-Greene conveyor. Sand produced by crushing is settled in a Deister settling tank and is disposed of.

The impact machine has replaceable liners and serves as a crusher, as well as a soft stone eliminator, to produce particles of desirable shape free from elongations and flats. By its installation, loss on the Los Angeles rattler has been dropped about five percent.

Dust Into Dollars

(Continued from page 30)

conveyor which feeds it into one end of the pug mill. It will be noticed in the illustration that there are two chutes feeding into the pug mill; one from the dust bin screw conveyor, the other taking the "blow down" dust directly from the waste heat boilers.

The pug mills do an excellent job of intimately mixing the dust with the slurry cake. Mixed dust and slurry cake is dropped out of the pug mill at the opposite end in a chute which loads directly into the feed end of the kiln.

A rheostat control on the screw conveyor motor governs the speed and regulates the flow of dust into the pug mills in proportion to the slurry cake feed.

The six Norblo dust collectors are operated three to each kiln. They may be operated independently or three to each kiln, but the three units function for one waste heat boiler.

Under test 80,000 lb. of dust were collected in 24 hr. or about 40 lb. to the barrel of cement manufactured in one kiln.

New Federal Specifications for Cement-Water Paint

NATIONAL BUREAU OF STANDARDS, U. S. Department of Commerce, has printed "Proposed New Federal Specification for Cement-Water Paint" for consideration of the trade before submission to the Federal Specifications Executive Committee for adoption and use by the government departments. The specification is based on results being obtained at the National Bureau of Standards in its study of paints for exterior masonry surfaces, and covers white and tinted cement-water paints.

In addition to requirements for

mixes and gradings of aggregates to be used in paint powders, methods for inspection, sampling and testing are covered in detail as well as recommended practices in the application of these paints to wall surfaces.

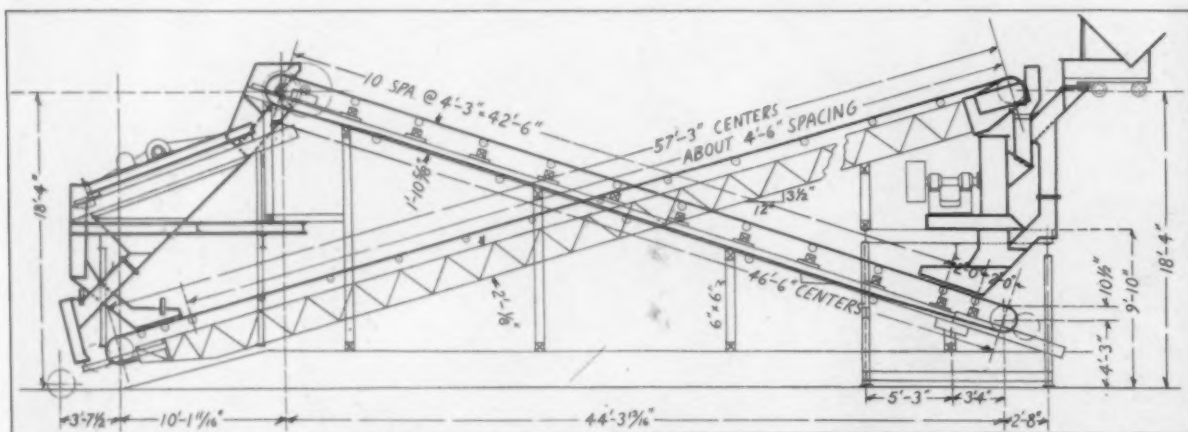
A.S.T.M. Committee on Gypsum Changes Tile Standards

IN ORDER that certain requirements in the Standard Specifications for Gypsum Partition Tile or Block (C52-33) may be more in line with the Federal Specifications, A.S.T.M. Committee C-11 on Gypsum at its Washington meeting during Committee Week, March 3 to 7, agreed on certain modifications which will be offered for immediate adoption as standard.

Consideration is also being given to the incorporation of the so-called ammonium acetate method for determining the purity of gypsum as an alternate to the gravimetric method, considerable data on this subject having been referred to the committee.

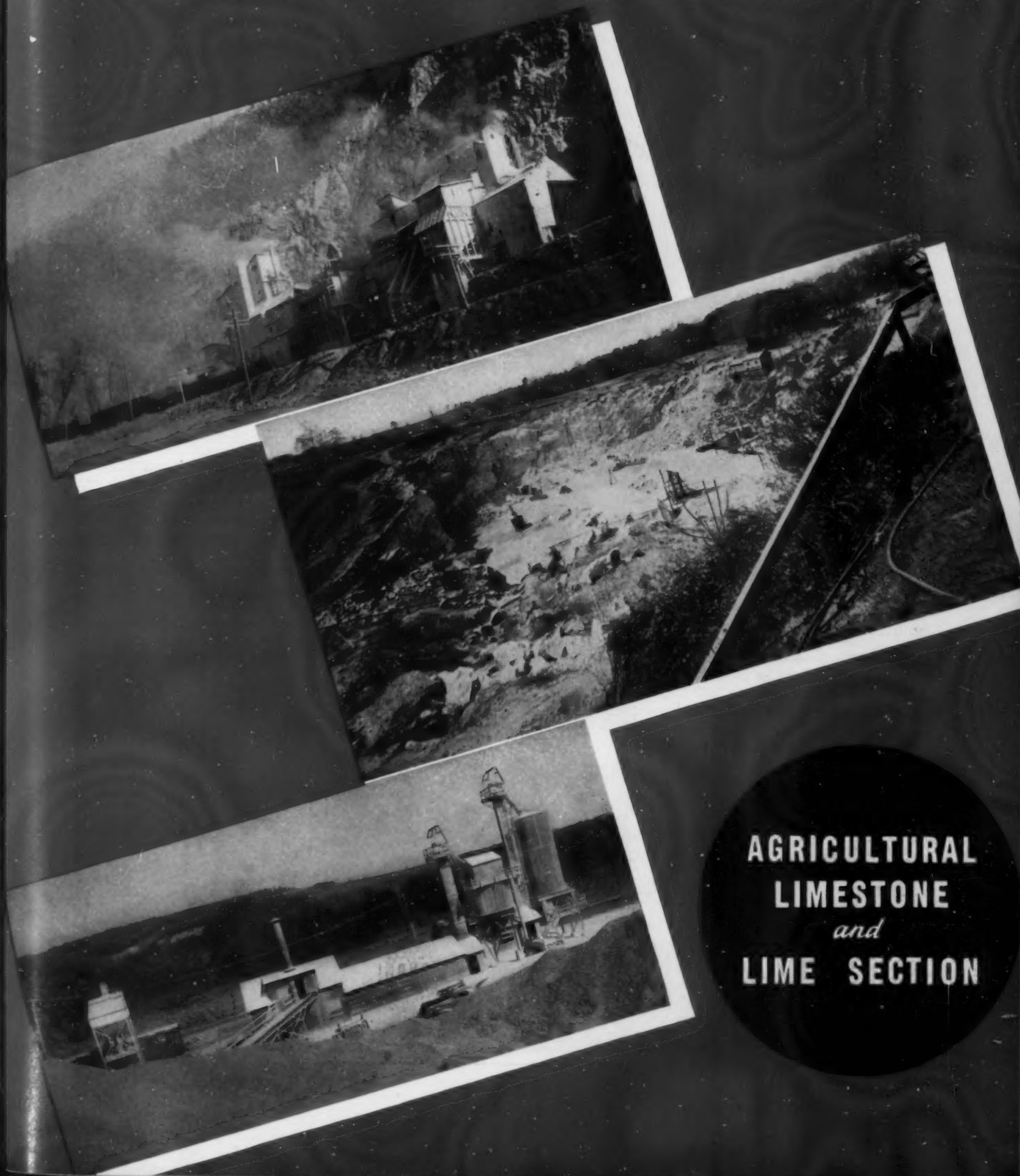
In the Standard Methods for Testing Gypsum and Gypsum Products (C26-40), the committee will propose that the sections on absorption tests (both total and rate of absorption) be deleted for the reason that no requirements on this property are incorporated in quality specifications.

One of the important activities of the society committees is in connection with nomenclature and standardizing of terms and definitions. Committee C-11 has developed changes in the terms covering gypsum lath, gypsum wall board and gypsum sheathing board which will be recommended for adoption as standard. The committee will also recommend the dropping of the definitions of the term "gypsum plaster board."



Plant elevation showing closed circuit system of crushing and screening gravel with return belt conveyors

Rock Products



AGRICULTURAL
LIMESTONE
and
LIME SECTION



"SELECTRO" (selective throw) vibrating screens are aiding the Willingham-Little Stone Company, one of Georgia's largest agricultural limestone producers to produce about 800 tons of material in 24 hours. There are three 4- x 10-ft. "SELECTRO" vibrating screens operating in closed circuit with two hammermills.

They are the positive eccentric type screen which imparts a uniform gyrating circle-throw motion to the entire screening surface. Stroke is adjustable to eight distinct intensities by adjustment of the compound eccentric (operat-

ing as a simple eccentric) inside the oil cases. The length of the stroke largely determines screening efficiency because conditions such as moisture or temperature change affect the mass tendency of most materials.

The SELECTRO (selective throw), with its exclusive features, meets all the rigid requirements demanded of the ideal screen. It is dependable—trouble free—economical in performance, simple in design and operation and above all, it costs less to own and less to keep on the job, year in and year out.

Write for our Bulletin 939

PRODUCTIVE EQUIPMENT CORP.

2926-28 WEST LAKE ST. CHICAGO, ILL.



MAKERS OF THE
FAMOUS "JIGGER"
"SELECTRO" GYROSET
SCREENS

Agstone Consumption Shows Big Increase

By BROR NORDBERG

Over six million tons of agricultural limestone in A.A.A. Program alone; exceeding all previous records

NOT SO MANY YEARS AGO, screenings below 8-mesh, or even a larger top size, were sold for agricultural limestone; now a much more refined product is required. The stone itself must have a minimum neutralizing value based upon calcium carbonate content and magnesium carbonate computed in terms of calcium carbonate neutralizing value. A minimum top size must be met; and purchasers of the material, whether financed by the government or not, favor as much of the extreme fines, or flour, as they can get for early availability to the soil.

A study of producing plants in some of the Southern States where the soil improvement program is most active has revealed some differences in specifications and wide divergence in methods of production. In some states, the fact that 90 per-

cent of the product passes a 10-mesh sieve is sufficient and, in some counties, 20 percent on the 10-mesh screen is not rejected but the producer is cautioned that his product is becoming too coarse. In other localities, 100 percent of the material must pass the No. 10 sieve and some specify that a certain percentage of extreme fines be included. Florida, for example, asks for 98 percent through 10-mesh and a minimum of 40 percent through 100-mesh. Alabama asks a 90 percent calcium carbonate equivalent, 90 percent minus 10-mesh and 50 percent minus 60-mesh, with all the finer particles included. However, the general rule is to have required minimum chemical standards, and it is enough that 90 or 100 percent pass 10-mesh.

Agricultural stone is such a low-priced commodity, worth something like one dollar or \$1.25 a ton at the plant, that it is to the interest of the producer to meet the standards without the added cost of grinding finer than necessary. Some plants are putting out an extremely finely-ground product, for which they get no higher price, but special plant conditions make it possible to do this profitably.

The current government-financed program has resulted in awarding contracts to be filled by late in June, keeping many plants extremely busy and causing new concerns to enter the business of grinding and selling agricultural limestone. Each plant that has contracted to furnish agricultural limestone under the federal soil conservation program is consigned parts of, or entire counties, and rail or truck delivery, usually on contract, are used.

Capacities of the various agstone-producing plants seem to run from 7 or 8 tons per hour up to 60 or more. There are several instances of water-floated fine limestone as such from screening or as a by-product of other industries such as zinc recovery processes, or large scale stone sand operations, where the limestone is recovered after settling, but these are exceptions.

Equipment Required

Just as individual plant capacities vary, so do the methods of manufacture. Types of equipment seen in operation are various makes of hammer mills; roll crushers; roller-type pulverizers such as the Raymond



Reinforced concrete storage and loading out facilities especially built for agstone by the Kentucky Stone Co., High Bridge, Ky. Truck is drawing hammer mill feed



Close-up of hammer mill whose production is elevated direct to storage bin. Feed size is not more than 1-in. at Kentucky Stone Co. plant



At the plant of Cook Stone Co., Hopkinsville, Ky., the hammer mill feed is usually direct from the quarry. Hammermill is behind stairway, finished bin is on the right, and main plant is to the left

high-side mills, Kent, Bradley and Fuller mills; rod mills; and tube mills using balls for grinding media. Capacities of the several types of pulverizing equipment differ for many reasons other than rated output based upon size of the equipment.

Some of the mills operate in open-circuit, while others are closed-circuited with vibrating screens or even with air separators. Open-circuit grinding, as a rule, does not produce as uniform a product with some types of pulverizers due to a drop off in efficiency, as the mills become worn. This is true only in some types of mills, but is not a serious factor in some States, where the interpretation of tests is lenient. Vibrating screens used with these mills are an effective means to compensate for mill wear and its adverse effect on fineness of product, and are also the means of increasing output since the discharge openings of the mills can be opened up wider and a circulating load employed.

Size of feed and quarry conditions likewise influence capacity. Many operators feed only a minimum top size of stone, such as minus 1½-in. into their mills while others, using hammer mills, put through man-size stone up to 150 lb. to produce agricultural stone in a single pass. All the types of mills mentioned have their advantages. Some of those with higher capacities require more maintenance than others of modest capacity. In certain plants it is desirable to have a mill that can take a large feed; in others it is preferable to have a mill that can produce a milled product from a feed material high in fines.

In some instances, a survey of a quarry reveals a stratum of stone too soft for commercial purposes that produces a fine agstone product, and with far less wear on the mill, along

with increased output. High siliceous content is to be avoided in most types of mills in order to hold down maintenance. After heavy rains it is often undesirable to feed the finer sizes of quarry-run stone into a mill, since they tend to clog and reduce capacity, and therefore some care must be exercised in selecting the mill feed.

Lime plant operators are finding agricultural limestone a good outlet for spalls, while commercial stone operators find it an effective way to balance production besides being profitable. Excesses in certain sizes become the feed to the "dust" plant. An agricultural limestone mill is sometimes an integral part of the plant, to receive a feed direct from the plant stream or from a surge bin. Other plants have an independent mill set-up which can be fed stone direct from the quarry or, optionally, direct from the main plant by way of some type of conveyor.

At least one plant was observed operating entirely on agricultural stone on two shifts, before starting

to produce commercial stone for the regular construction season. This plant is rated at 100 to 150 tons capacity on regular production but was putting all stone, from a soft-stone stratum, through the regulation crushers to fill a large surge bin with minus 1½-in. product. A 48 in. Williams hammer mill was fed from this surge bin to produce 40 tons of agricultural stone per hour to which was added another 20 tons accumulated as dust through the regular crushing plant. Operations of a few plants are described to illustrate various kinds of operations:

Kentucky Operations

In Kentucky, practically all of the agricultural limestone is pulverized by hammer mills, mostly in open-circuit.

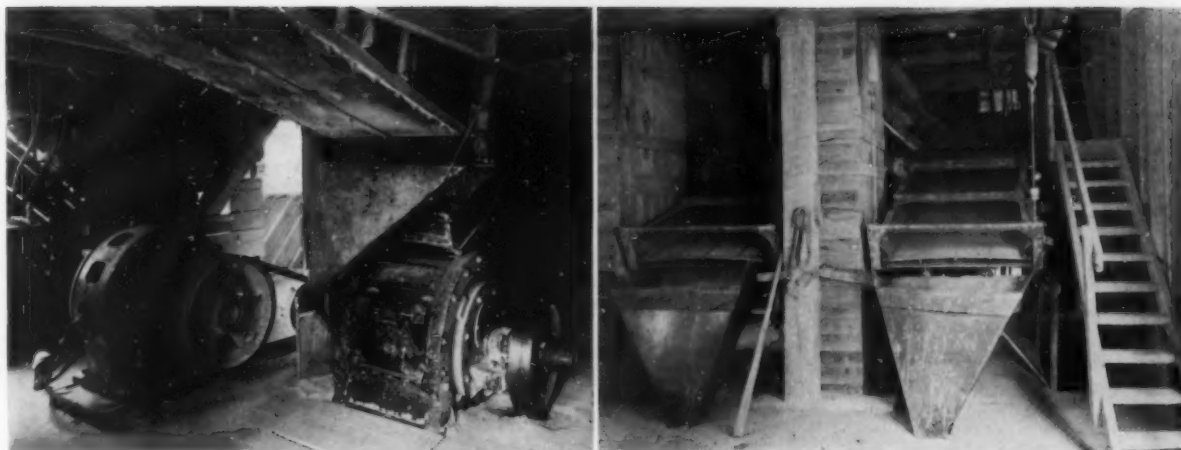
KENTUCKY STONE CO., at High Bridge, has an operation that is typical. The plant proper is rated at about 75 tons per hour of commercial stone and the stone tests about 92 percent CaCO_3 . Ballast is one of the principal outlets of this plant.

In 1940, an agricultural limestone plant was built independent of the main plant, which consists of a 3XB Gruendler hammer mill, and an open-type belt-bucket elevator filling a 200-ton concrete storage bin with the finished product. This plant is adjacent to a railroad siding for direct loading into open-top railroad cars or trucks, and to receive feed direct from end-dump motor trucks. Generally surplus stone up to 1-in. top size is fed into the mill, and this feed can be conveniently taken from plant bins or from stockpiles by trucks.

A manually-operated gate under the truck hopper is the means of



Man size stone and also spalls are the feed for the hammer mill at the Erin Lime & Stone Co., Erin, Tenn. Cars on rails or trucks haul the stone



Left: One of the pulverizers making agstone at plant of Maymead Lime Co., Shouns, Tenn. Scalping screen overhead by-passes fines. Right: Two vibrating screens are in closed circuit with the two pulverizers

regulating the feed into the mill which is driven through a V-belt from a 100-hp. electric motor. The government requires that 90 percent of the finished product pass 10-mesh. The mill is producing about eight tons per hour, without use of vibrating screens, and has $\frac{1}{8}$ -in. and $\frac{3}{16}$ -in. spacings between the grate bars to govern the size of output, which feeds directly into the bucket elevator filling the concrete bin. Similar installations are being made at other plants of the company. At its Mt. Vernon plant, a Day pulverizer is producing from 15 to 30 tons of agricultural limestone per hour, depending upon the size of feed and the quarry conditions. Stone is trucked to the plant, and in producing agstone only, is by-passed some of the equipment ahead of the pulverizer. Generally the top size of feed is 1-in.

Use Skip Buckets For Hauling

Crush one-man stone with hammermill

COOK STONE Co., Hopkinsville, Ky., furnishes good evidence of the practicability of producing agricultural limestone from man-size stone in a single pass. This company has a ledge of limestone, running 99.3 percent CaCO_3 , that is too soft for commercial purposes and is selected for agricultural stone.

In March, 1940, an agricultural limestone plant was built, consisting of a 42- x 36-in. Jeffrey heavy-duty, swing-hammer mill, V-belt driven by a 150-hp. electric motor, and a bucket elevator to a finished product bin.

This plant uses hand-loading in its quarry exclusively, and most of the quarry-run stone is handled to either the commercial plant or agricultural

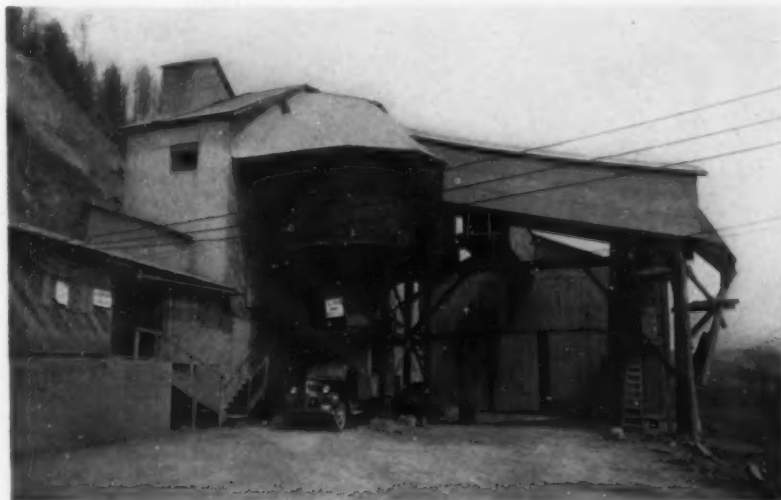
limestone plant by Brooks Load-Luggers. The skip buckets have 2- and 3-ton capacities, on Ford and International trucks, and the buckets stand only 27-in. high in the quarry which means that man-size stone is likely to be fairly large. Individual pieces run as high as 150 lb. and down to fines.

Grate bars in the mill are set up close to govern the size of product, and the mill is producing an average of 30 tons per hour. An average analysis of the product, with the hammers in reasonably good condition, is from 7 to 8 percent retained on a 10-mesh sieve, with about 30 percent minus 60-mesh and 9 percent passing 100-mesh.

When analyses indicate the product is becoming too coarse, some adjustment can be made to the breaker plates, and later the hammers are turned. After a year's continuous operation, night and day, with little let-up except in the summer, the mill is still only on its second set of hammers.

Under extremely wet quarry conditions, fines in the quarry are avoided as much as possible in loading the skip buckets, and the drained larger sizes containing only surface moisture are loaded. Location of the mill adjoins the main plant and feed can be taken direct from this plant.

Bin capacity for agstone is about 150 tons and deliveries are made either by truck or by rail. The company has a contract to furnish, deliver and spread its product, but delivery and spreading equipment are rented. Some advertising is done in county papers and on the local radio.



Maymead Lime Co. uses weigh batcher to weigh out agstone to trucks from overhead live storage. Agstone is returned to the bin from shed storage by inclined belt, right

Spalls for Agstone

**Lime plant gets uniform product
by screening in circuit with mill**

ERIN LIME AND STONE CO., Erin, Tenn., producer of high calcium lime, has gone into the manufacture of agricultural limestone as a means of cleaning up spalls and to furnish the agstone requirements for several several counties.

This grinding plant is located so that it can receive its feed from overhead tram cars, which charge the vertical lime kilns. Stone is handled from the quarry by a Brooks Load lugger which dumps into a 2-cu. yd. tram car at the foot of the incline, from which point it is pulled by an electric hoist to the crusher. A Gruendler 3 X B hammer mill is operated in closed-circuit with a 42-x 96-in. Universal 2-deck vibrating screen, placed directly over the finished product bins of 300 tons capacity.

The mill discharges into a bucket elevator which in turn discharges over the screen, with rejects returning into the grinding mill through two chutes, the fines entering the finished product bin. By use of a screen in circuit with the mill a uniform product is produced to the requirement of 90 percent through 10-mesh; and the screen is the means of "ironing out" variations which occur because of mill wear.

Top size feed into the mill is 120-lb., man-size stone and the drive is a 125-hp. slip ring motor connected with V-belt. Feed is generally quarry-run, and the capacity varies from 20 to 30 tons per hour.

After some experimentation, the screen was mounted at a 45 deg. angle and equipped with 3/16-in. sq. openings on the top deck and 8-mesh on the bottom deck. The top deck is merely protection for the finer cloth, with the rejects from both decks returning into the mill, and the direction of vibration of the screen is the same as the direction of flow of the stone over it. Normally, the circulating load runs from 10 to 15 percent of the output of finished product.

Maymead Plant

In the extreme northeasterly corner of Tennessee, just 14 miles from Virginia and 12 miles from North Carolina, the MAYMEAD LIME CO., Shouns, Tenn., has established an agricultural limestone plant, serving counties in two states.

The Maymead Lime Co. is owned and operated by Maymead Stock

Farms, Inc., and is headed by W. B. Mount, president, and J. B. Mount, secretary-treasurer. In 1929, the Mount brothers, who are large land-owners, purchased a small agricultural limestone plant with a capacity of 8 tons an hour for the purpose of producing agricultural stone for their own farm, which normally requires about 1700 tons annually.

As interest in soil conservation grew, more and more agricultural stone was sold; and the plant was rebuilt in 1936, and enlarged in 1940. Today, the company operates a well-equipped plant producing agricultural limestone only, which has a capacity of 40 tons per hour. Upwards of 40,000 tons were sold in 1940 and about 70,000 tons will be sold in 1941, according to estimates.

A deposit having peculiar characteristics and desired qualities for soil liming is being excavated from a hillside adjoining the plant. It would probably be described as a disintegrated dolomitic limestone with a high percentage of moisture. As a result, this plant has unusually large screen surfaces in operation with grinding mills.

North Carolina requirements are for a calcium carbonate-magnesium carbonate equivalent of not less than 85 percent calcium carbonate, for the soil conservation program, with all the pulverized stone to pass a 10-mesh sieve. Tennessee requires a neutral-

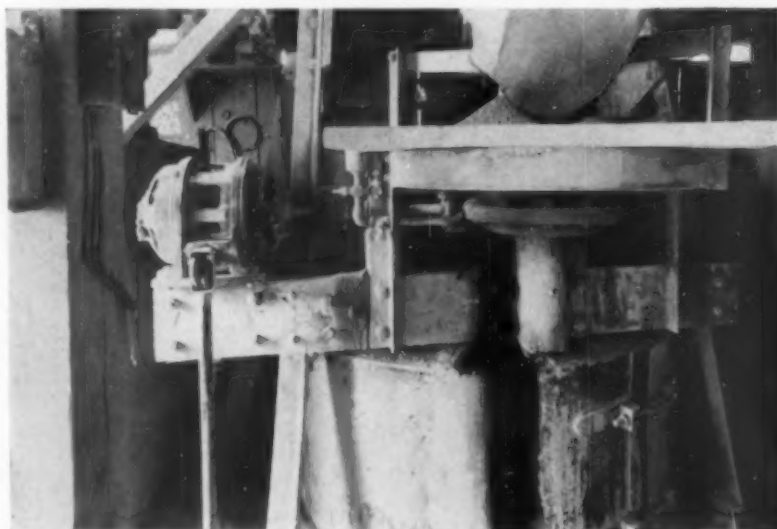
izing value of 80 percent calcium carbonate equivalent, and 90 percent to pass 10-mesh, with all the fines included. The North Carolina requirement is more rigid and is therefore the standard to which the company grinds all its product. An average sieve test shows 100 percent passing 10-mesh and about 44 percent 100 mesh.

The plant is a dual unit, either half of which may be operated without the other. Each half consists of a Brooks Equipment Co. Day No. 7 pulverizer, which is preceded by a scalping vibrating screen, and with two additional vibrating screens in closed-circuit for finish sizing.

One unit was built in 1936, with a 3- x 8-ft. double-deck Allis-Chalmers Aero-Vibe screen mounted directly over it to scalp out the fines. Pulverized material is elevated and split to a 3- x 8-ft. single-deck Universal vibrating screen and a 3- x 8-ft. Allis-Chalmers screen, with the rejects returning to the mill and the fines joining the by-passed material into a bucket elevator as finished product.

The new unit is similarly arranged, but with two 4- x 10-ft. Allis-Chalmers single-deck finish screens. It will be noted that plenty of screening surface is desired in this operation. False decks below the screens are the means of transferring the throughs by chutes to the bucket elevators.

After stripping, there is a 100-ft. face, extending for a width of 200 ft. Much of the material is excavated direct by hand shovels and sledges, and wheelbarrows are considered the most economical way of delivering the material to the plant. When nec-



Close-up of pulverizer, Pounding Mill Quarry, which is fed by motor-driven feeder. An automatic overload feature controls rate of feed to mill which is closed-circuited with overhead screen

essary to blast, a ton of dynamite brings down about 8000 tons of rock.

The distance to the plant is short and downgrade, and the wheelbarrows are dumped over 5-in. spaced grizzly bars, one for each half of the plant. Feed from the small hoppers under each grizzly to the scalping screen is regulated by a 16-in. Tel-smith pan feeder.

Scalping screens have 1-in. square mesh cloth on the top deck to protect the 10-mesh wire cloth on the lower deck, and the oversize from both decks comprises the feed to the pulverizer. A bucket elevator splits the pulverizer discharge over the two finishing screens in each unit, which have 10-mesh wire cloth. Rejects return to the pulverizer in each case and all minus 10-mesh material is elevated into a bin as finished product.

Scalping screens are necessary ahead of the pulverizers to by-pass the fines which would have a tendency to clog the pulverizers, particularly when the quarry is wet. It isn't uncommon to scalp out as much as 20 percent fines ahead of the mills. Moisture content averages probably 2.5 percent but sometimes runs as high as 6.5 percent with a reduction in capacity for the entire plant down to 30 tons per hour from a peak of as high as 45 tons under dry conditions. Life of the hammer tips in the mills is likewise adversely affected by wet material.

Using vibrating screens in circuit with the mills increases overall capacity, at a uniform grind, to the required fineness. Generous screening surface is desired, since the damp or wet material tends to blind and decrease the effective screening area, thereby adversely affecting the circulating load. Long poles are flicked over the screens with a whipping action occasionally when blinding becomes excessive.

Each mill is driven by a 100-hp. motor and has an overhead relay to kick out the main motor and all driving motors when the mills become overloaded.

Belt conveyors are the means of transfer to a 215-ton steel bin, out of which material is weighed out in a 1-ton Blaw-Knox batcher. Weighing is done with a Kron scale and a sample is taken from each 1-ton batch. Tests are made weekly from the composite samples. At present, all the plant output is trucked, on contract, distances up to 80 miles into ten counties in North Carolina and in Tennessee. Rail facilities have been interrupted at least temporarily, because of floods.



Any desired size dry stone is transported from the main plant of Pounding Mill Quarry Corp., Pounding Mill, Va., to agstone plant. Feed material bin is directly over pulverizer

Automatic Feed Control

A DIFFERENT TYPE of plant is operated by the POUNDING MILL QUARRY CORP., Pounding Mill, Va., which is producing specification agricultural limestone for application in Virginia, W. Virginia and Kentucky.

The plant is entirely separate from the main plant and consists of a Bradley Junior Hercules mill operated in closed circuit with a 4- x 8-ft. Tyler Hum-mer vibrating screen. The Bradley mill is a 3-roll mill, which discharges peripherally around the bottom through a circular screen. It is an adaptation of the Bradley mill so widely used in the cement industry for fine reduction.

The plant was built in 1938 with an overhead surge bin of 75 tons capacity to receive feed material from trucks by way of an overhead ramp. The bin is centered directly over the grinding mill. The plant was built as a general utility unit to balance the production by grinding surpluses of various stone sizes into marketable products. It is a simple procedure to remove unwashed stone of any size from the main plant bins and put it through the pulverizing plant.

Feed material might be any size up to 1½ in. top, such as a minus ¼-in. material, or a size from ¾- to ¾-in. or ¾- to 1½-in. The mill is direct-driven by a 100-hp., 900 r.p.m. electric motor and is fully automatic in its operation. The feed is direct from the overhead bin over a motor-driven feeder driven by a 1½-hp. electric motor. When the motor load reaches 90-hp. the feeder automatically stops. Thus, in wet material when the screen blinds the circulating load will build up and the feed will cut out.

These mills are sometimes used in open circuit to produce agricultural limestone, with the product sizes governed by the size openings in the mill's circular discharge screen. Some size opening such as 14-mesh is commonly used.

In this plant, a 3-mesh opening is used to get more volume through the mill and the size is governed by the overhead vibrating screen. The result is increased production.

From the mill, the pulverized material is elevated to the vibrating screen which has approximately 10-mesh Ty-Rod cloth, equivalent to a finer opening when the slope of the screen is taken into consideration. Fines drop into the finished product bin of 150 tons capacity and the oversize returns on to the feeder through an enclosed spout.

The mill is producing about 7 tons an hour of a product with considerable fines, which are desirable in agricultural stone. Output varies slightly with the size feed and moisture conditions, and would increase to 8 or 9 tons with a dry feed of fine material below ¼-in. The circulating load between the mill and screen is about 50 percent.

Stone in the Pounding Mill quarry is very tough and hard. It has a Los Angeles rattler test loss of only 21 percent on 500 revolutions. A typical normal gradation of agstone runs 100 percent through 10-mesh, 99 percent through 20-mesh and with 71 percent minus 50-mesh and 47 percent minus 100. Thus the product is high in fines.

At times a stone sand is produced by the mill and screen by insertion of another screen deck.



Overall view of Campbell Limestone Co. plant. On left is scalping screen and reduction crusher unit; in the center, wet screening and bins; and right, dry screening and storage

Screen Agstone - Wet and Dry

Campbell Limestone Co. uses selective quarrying methods

AGRICULTURAL LIMESTONE is produced through a combination of a gyratory crusher, a pulverizer and both wet and dry screening by the Campbell Limestone Co., Gaffney, S. C. Production of lime was started three years ago on a small scale, but in 1940 the plant was equipped to produce 50 tons of agricultural stone per hour, either separate from or along with the crushing and sizing of commercial crushed stone.

The entire plant was remodeled two years ago to crush both quarried and mined stone, and now is equipped to produce almost half its capacity of 120 tons per hour in agricultural stone.

Selective quarrying is done to produce agricultural stone, since much of the stone is a dark limestone schist too low in calcium carbonate equivalent for soil liming purposes. Practically all the high grade limestone testing 70 to 75 percent CaCO_3 and 15 to 22 percent MgCO_3 with a calcium carbonate equivalent of over 90 percent, is taken from the mine. Drift mining, by the standard room-and-pillar system, is employed. A combination of loading by an electric shovel into $3\frac{1}{2}$ -ton Mack trucks and hand loading into Dempster Dumpster $2\frac{1}{2}$ cu. yd. skip buckets is used for flexibility in delivering stone of both types to the crushers. Fifteen skip buckets are handled by three Mack trucks in the hand-loading operation.

Practically all the crushing is accomplished on the quarry floor level. The primary breaker for road stone is a 24- x 36-in. Worthington jaw

crusher which discharges on to a belt conveyor to a secondary crusher which is a No. 6 Allis-Chalmers gyratory. An Allis-Chalmers stationary grizzly, with 2-in. spacings, bypasses the fines from the belt conveyor discharge to join the discharge from this crusher on a 20-in. belt conveyor, 365-ft. centers, which elevates all the stone out of the quarry to a scalping unit at the main plant.

Selected stone for grinding is transported out of the quarry by the same belt, but can be done as an independent operation. A combination of a No. 8 Allis-Chalmers McCully crusher and an Allis-Chalmers 4 A Pulverator perform this reduction, while also producing a $\frac{1}{2}$ -in. minus seal stone product when the main plant is not in operation. Generally,

all production proceeds simultaneously.

High calcium stone is dumped either from the trucks or skip buckets into the No. 8 crusher, and the product is placed in storage by an inclined belt conveyor. This product ($3\frac{1}{2}$ in. minus) is the Pulverator feed, which is reclaimed from the surge pile by a tunnel conveyor belt to permit the production of agstone without operating the quarry. The Pulverator is direct-driven by a 250-hp. electric motor and discharges on to a cross belt conveyor for transference to the long belt conveyor.

Plant operation from this point on is practically the same for either the production of agricultural stone or commercial sizes. Screening is done, first dry, and then wet over screens



On the right is the crushing unit for the main quarry products, Campbell Limestone Co., Gaffney, S. C. Rock is put through gyratory crusher, the throughs being conveyed to a surge pile, right, from which they are reclaimed by tunnel belt to a hammer mill near crusher on left. Product of this mill is transported by the long belt conveyor to the plant above

located over bins and inter-connected by belt conveyors.

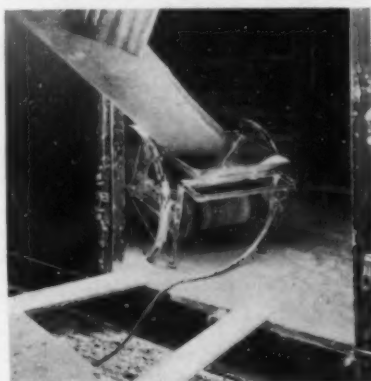
Coming from the quarry and mines, stone is first passed over a 4- x 8-ft. Stephens-Adamson single-deck vibrating scalping screen which is in closed circuit through belt conveyors with a No. 7 Allis-Chalmers Newhouse crusher. This screen determines the top size of commercial stone to be produced, and throughs from it are carried over an inclined 20-in. belt conveyer, 150-ft. centers, to the sizing screen where sizing is done dry. This sizing is done over a 4- x 12-ft. Allis-Chalmers low head double-deck screen by which the fines are removed for agricultural stone and oversize is transferred to the wet screening plant. A $\frac{3}{8}$ -in. sq. wire mesh on top keeps the load off the 8-mesh screen below, through which the fines pass to a 200-ton steel agricultural stone storage bin.

Wet screening is over an identical type screen, the top deck producing three sizes of commercial stone (usually a $\frac{1}{2}$ in. down, $\frac{3}{4}$ in. minus and a 1 $\frac{1}{4}$ -in. product). Fines pass through a 9 $\frac{1}{2}$ -mesh screen on the bottom deck, along with the wash water, into a tank from which a Wilfley pump, with a 6-in. suction and 4-in. discharge, pumps the fines into a large settling area for recovery as agricultural stone.

This completes the agricultural limestone operation by both the wet and dry methods. Under wet quarry conditions, with proportionate decreases in dry screening efficiency, as much as 50 or 60 percent of the plant capacity of 50 tons of agstone per hour is screened out with the application of water. In dry weather, this percentage drops to 10 or 20 percent.

Weather influences the production only so far as screening efficiency is concerned. The Pulverator is operated with the grate bars opened to $\frac{3}{4}$ in. in order to get the incidental production of small stone sizes. About 70 percent of its product will go through a 10-mesh screen (agstone) when the hammers are in good condition. When this proportion drops with hammer wear to about 50 percent, the hammers are replaced. Fifty hours of production is the average before changing hammers.

Storage capacity is 200 tons of dry agricultural stone in a steel bin under the dry sizing screen and 30,000 tons in wet storage, consisting of two sumps from which the water is pumped. An average of two weeks'



Box car loader distributing agstone spouted from overhead bin. Willingham-Little Stone Co.

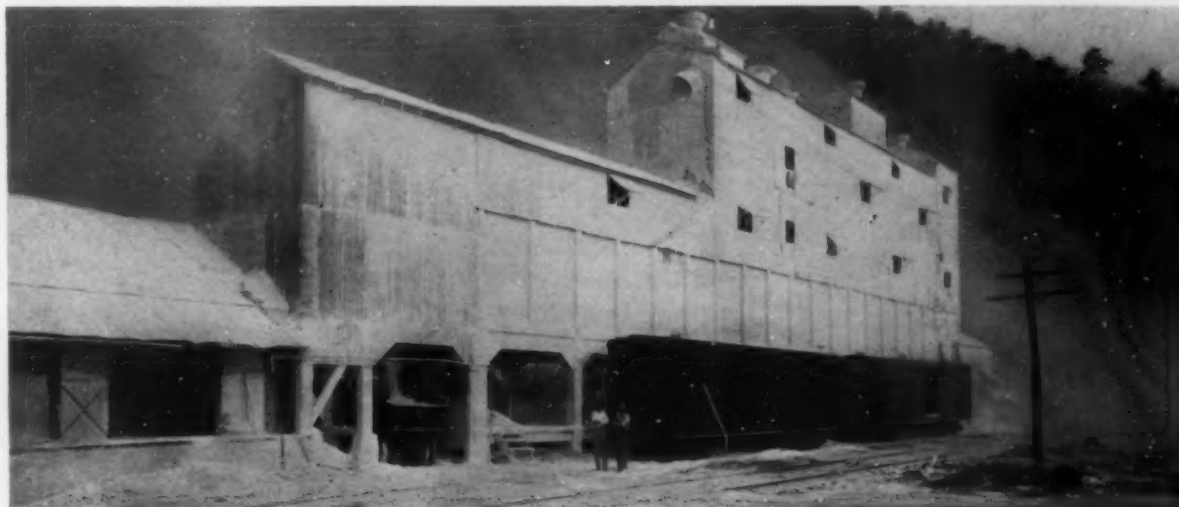
time, with some re-handling by an Allis-Chalmers semi-Diesel tractor and Baker bull-dozer blade is needed to drain the stone to 8 percent moisture which is the specified maximum for the federal agricultural limestone program. This bulldozer keeps



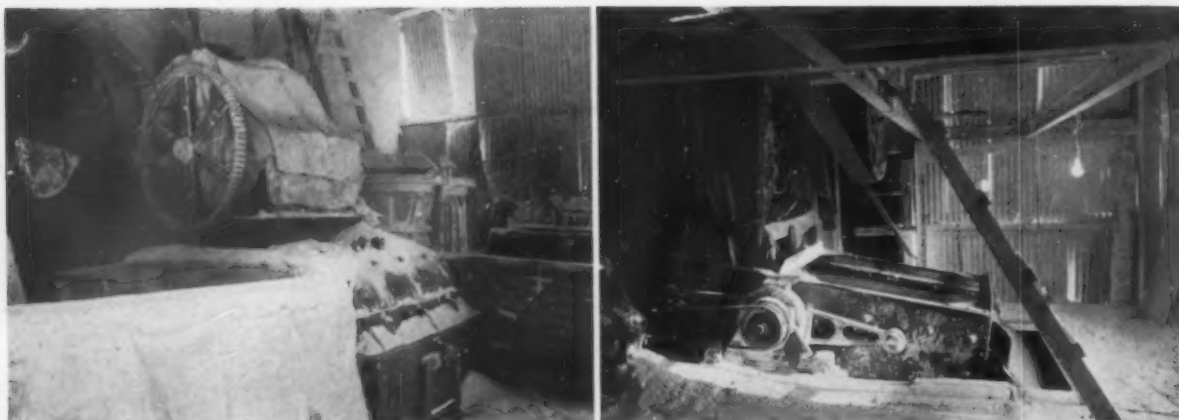
"Pulverator" which produces 50 tons of agstone an hour at Campbell Limestone Co., from 3 $\frac{1}{2}$ -in. minus feed is driven by 250-hp. motor

turning and moving the material within range of a 1 $\frac{1}{4}$ -cu. yd. drag-line which loads the product into trucks. Dry agstone is also taken from bin storage and stored in the open. Some moisture is preferred for ease in handling and applying the product to the soil. The same handling equipment is used in building stockpiles of other stone and in returning the stone to live storage over a reclaiming tunnel belt for truck loading.

Agricultural stone is shipped by either truck or rail into Georgia, North Carolina and in South Carolina. Georgia and South Carolina requirements are for 98 percent to pass 10-mesh and 40 percent minus 100-mesh; North Carolina requires 100 percent to pass 10-mesh.



One of the largest producers of agstone in the South, the Willingham-Little Stone Co., Whitestone, Ga., has a plant which specializes in fine products and agstone. Note truck and carloading facilities



Left: High capacity pulverizer for agstone, Willingham-Little Stone Co. Bucket elevator carries output to overhead screens. Right: One of the vibrating screens on fine sizing which operates in conjunction with hammer mills

By-Products of Fine Grinding

Agricultural limestone one of several products

PROBABLY the largest producer of agricultural stone in the State of Georgia is the Willingham-Little Stone Co. at Whitestone, north of Atlanta. This company mines a pure white dolomite and produces special products for terrazzo, cast stone manufacture, fillers and other uses for which a white stone high in carbonates is particularly suitable. This stone averages 59 percent CaCO_3 and 49 percent MgCO_3 , which combines for a high soil neutralizing value.

Products are shipped over a wide territory and range from $2\frac{1}{2}$ in. down to as fine as 85 percent through 200-mesh, which is an air separated product. Hammer mills serve as reduction crushers and to produce agricultural stone simultaneously with the grading of other fine products. Agstone capacity has been increased recently by the addition of a 30- x 40-in. American Pulverizer Co. hammer mill, which combines with the output of an identical mill installed earlier, to produce about 800 tons in 24 hours.

The plant is located on the side of a hill, with trucks bringing stone from the mines to a No. 5 Allis-Chalmers Gates gyratory crusher placed on the level of the drift mine floor, which is at the approximate level of the screens in the top of the plant.

Reduction through this crusher is to $3\frac{1}{2}$ in. minus, which can be conveyed to either of the two hammer mills. One alternate is to convey the stone direct into a surge bin, out of which is fed one of the hammer mills on the lower plant level, from which the mill output is elevated to a 4- x 10-ft., 3-deck Productive Equipment Co. "Selectro" vibrating screen in the

head of the plant. Until the second mill was installed, the bulk of the agricultural stone was produced in this way, rejects returning to the mill.

A second alternate is to by-pass stone from the main belt near the primary crusher to the other hammer mill which is fed direct from a cross belt conveyor. This method of production is in use much of the time, with the mill discharge elevated to the same 3-deck screen, but with the rejects returning into the mill on the lower level. A combination of one mill to receive large stone and a second mill to handle rejects from the screen has increased the production of agricultural stone about one-third over the operation of the single mill in closed-circuit with the screen. About 800 tons a day is produced with this combination, but will probably be increased to 1000 tons by splitting fresh feed stone to both mills.

Ordinarily, the screen has, in order, $\frac{1}{2}$ -in., 5-mesh and 14-mesh openings on the three decks, and the rejects to the hammer mill are plus $\frac{1}{2}$ -in. stone or plus 5-mesh from the top and second decks. Plus 14-mesh minus 5-mesh product and sometimes plus 5-mesh minus $\frac{1}{2}$ -in. are conveyed to a second similar screen for further sizing of fine products, with minus 14-mesh dropping into a bin as agricultural stone.

The second screen might have $\frac{3}{8}$ -in., $3\frac{1}{2}$ -mesh and 6-mesh cloth on each of its three decks to be followed by sizing over a third Selectro screen with, probably, $5/32$ -in., 6-mesh and 14-mesh screening surfaces. Oversize from the last screen becomes the feed for a Sturtevant ring-roll crusher to return to the same screen or to be put

through a Sturtevant mechanical air separator. Minus 14-mesh from the screen goes into the agstone bin as well as the rejects from the air separator, which is used only in the production of extremely fine products.

In producing agricultural stone, with one hammer mill to pulverize fresh feed stone and the other to handle rejects only, grate bars are spaced $\frac{1}{2}$ -in. apart in the first mill and $\frac{3}{4}$ -in. in the reject-pulverizing mill. Each mill is driven through V-belt by a 100-hp. motor.

Probably two-thirds of the agricultural stone is shipped by rail, in open-top cars or in box cars where loading is done through a spout from overhead bins feeding to a Stephens-Adamson box car loader. Some of the product is packed in paper bags. Bin capacity is 700 tons.

Kimbalton Lime Plant

KIMBALTON LIME CO., INC., Kerns, Va., installed a fine-crushing plant a year or so ago to grind down minus 6-in. stone (spalls). Agricultural limestone as well as finer products are manufactured. This 6-in. product is fed to a 30- x 24-in. Gruendler hammer mill for a reduction to $\frac{1}{2}$ -in. top size, using grate bar spacings from $\frac{3}{8}$ - to 1-in. apart.

This becomes the feed to a Raymond high-side roll mill, which is operated with the separators disconnected, when producing agricultural stone. Production is about $7\frac{1}{2}$ tons per hour of a product with only a trace retained on 20-mesh, about 60 percent minus 100-mesh and 40 percent minus 200-mesh.

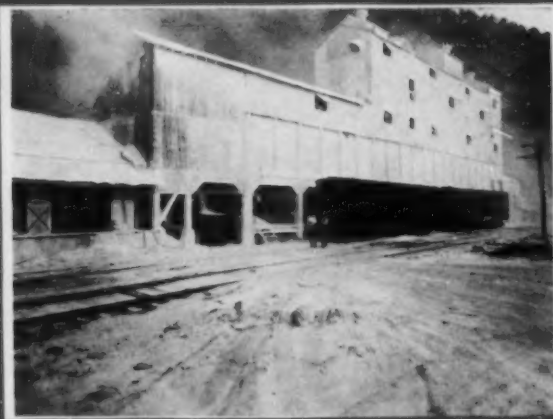
A Tennessee lime manufacturer, in installing a Jeffrey hammer mill to receive a regulated feed not to exceed $1\frac{1}{2}$ -in. top size, is putting in a vertical enclosed bucket elevator to carry the pulverized product to an overhead Tyler Hummer screen.



Front view showing grinding plate adjustment.



Two of two 30-in. 10-hp. American pulverizers installed at Willingham-Little Stone Co.



View of Willingham-Little Stone Co., Whitestone, Ga., one of the state's largest producers of agricultural limestone.

THE AMERICAN WAY IS THE ECONOMICAL WAY TO PRODUCE AGRICULTURAL LIMESTONE

The Willingham-Little Stone Co., Whitestone, Georgia, has recently purchased their second American hammer mill to step-up production on agricultural limestone to about 800 tons in 24 hours, and will probably be increased to 1000 tons by splitting fresh feed to both mills.

With agricultural limestone selling for around one dollar a ton at the plant, producers must carefully watch their crushing costs. Check up with producers now using AMERICAN hammermill crushers and they will tell you how they are turning out a uniform product with the lowest possible operating costs.

SIMPLICITY—in design and operation
—assures continuity of service.

STURDINESS—in construction—extra heavy construction, built to withstand the most severe service.

EXCEPTIONAL—operating characteristics—anti-friction bearings, Patented adjustable Grinding Plate, metal trap, manganese grinding parts and the original American Hammer design.

Let us show you how an AMERICAN Crusher will help you to produce agricultural limestone economically and dependably.

AMERICAN PULVERIZER CO.

1245 MACKLIND AVENUE

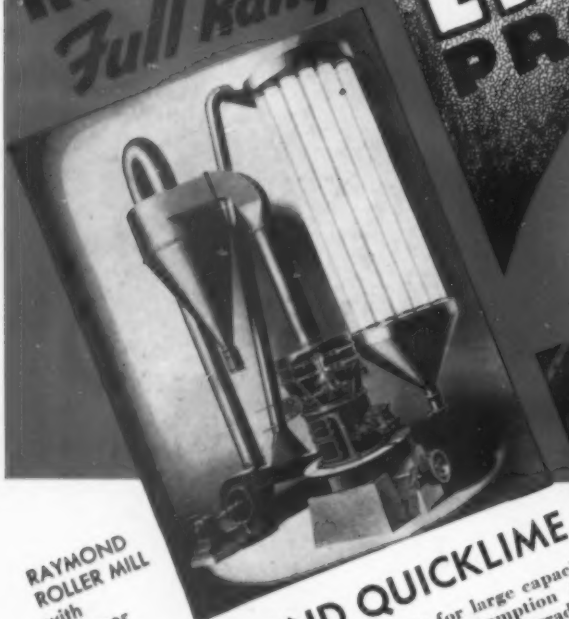
ST. LOUIS, MO.

RAYMOND Full Range

LIME PRODUCTION

from Agricultural Limestone
to Superfine Fillers and
Chemical Hydrate

To lime products manufacturers, Raymond offers a complete line of pulverizing and separating equipment that gives close control over the finished material and assures utmost economy in production. These machines will enable you to meet today's rigid specifications for uniform high-purity materials.



RAYMOND
ROLLER MILL
with
Whizzer
Separator

LIMESTONE AND QUICKLIME

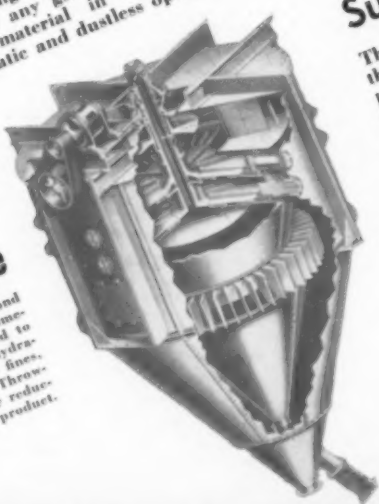
This is the ideal unit for large capacities and low power consumption in grinding limestone into various grades, as in making fillers and fertilizers. The unit may be equipped with a drying system for removing small percentages of surface moisture from the material while grinding. Fineness is controlled by changing speed of whizzer while mill is running. Also in pulverizing quicklime, it is easy to produce any grade from 50 to 200-mesh material in one continuous, automatic and dustless operation.

Refer your lime production problems to Raymond engineers... over a half a century of experience at your service.

MECHANICAL AIR SEPARATOR

Classifying Hydrated Lime

Double Whizzer type of Raymond Separator for making an extremely fine product. May be used to take the feed direct from hydrator and scalp off available fines, discharging oversize to a Throat Pulverizer for further reduction and purification of product.



AUTOMATIC
PULVERIZER
with
Whizzer
Separator

Super-Fine Hydrated Lime

This Pulverizer is equipped with a throw-out attachment for rejecting impurities, and delivering a pure, uniform product at any desired fineness to 99.5% through 400-mesh... as in making spray lime or chemical hydrate. The Automatic Pulverizer will take the feed direct from the Hydrator bin, or it will handle the tailings discharged from the Mechanical Air Separator, recovering the good lime and eliminating overburnt or underburnt lime and other impurities.

Descriptive Bulletins will be sent on request



RAYMOND PULVERIZER DIVISION

COMBUSTION ENGINEERING COMPANY, INC.

1307 North Branch Street

CHICAGO

One of the largest agstone plants in the South is operated by Liberty Limestone Corp., Buchanan, Va.

From Quarry to Farm

Federal A.A.A. soil conservation program has kept quarries at maximum production making agricultural limestone

MORE THAN SIX MILLION TONS of liming materials are expected to be applied to the land by farmers during 1941 as tonnage up to the present date is running much higher than a year ago and more agricultural limestone is contracted for under the A.A.A. program than last year. A very substantial increase in the application of phosphates also is expected.

The tonnage contracted for under the A.A.A. program does not represent the total, but does represent an increasingly large percentage of the mineral fertilizers purchased. While complete 1940 figures are not yet available from the government, the 1939 summary shows that the East Central region, composed of the states of Delaware, Maryland, Virginia, West Virginia, North Carolina, Kentucky and Tennessee, leading with a total of 2,219,421 tons of agricultural limestone; followed by the North Central region, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, South Dakota and Wisconsin, 1,969,276 tons; the Northwest region, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey and Pennsylvania, 1,368,752 tons; the Southern region, Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Oklahoma, South Carolina and Texas, 196,308 tons; and the entire Western region took only 38,202 tons.

In some states more liming materials are purchased outside the A.A.A. program than under it. For example, in 1940 Missouri farmers purchased 840,000 tons of liming materials outside the A.A.A. program which accounted for 538,164 tons.

Under the soil conservation program of the A.A.A., all contracts with producers or with contract haulers are indefinite as to amounts. As a matter of fact, the producers merely qualify as to quality of stone and adequacy of equipment and file a statement of prices. Until the Government issues their requisition and the producer accepts on each individual order, the contract is not completed. The producer or contract hauler receives a requisition for the amount desired by the farmer and is paid direct for his services and material, the amount being charged against the farmers' soil conservation credit.

Considerable criticism has been voiced as to the lack of proper sampling and testing of agricultural

limestone, and the failure to recognize the responsibility factor in awarding contracts to producers and haulers. Some fly-by-night producers have not delivered liming materials up to specification, and some have not been able to live up to contracts as there was insufficient capacity. A tightening up of regulations is being sponsored by the Midwest Agricultural Limestone Institute. The following tabulation of companies which have signed conditional contracts with the A.A.A. embraces the period from December 9, 1940 to April 5, 1941. It does not represent all the companies which are producing under this program or furnishing liming materials as many have not signed contracts but are selling direct.

A. A. A. Limestone Contracts

ALABAMA

Dolcito Quarry Co., Dolcito, Ala.
Chewacla Lime Co., Salem and Chewacla, Ala.
Tinney Quarry Co., Talladaga, Ala.
J. B. Patterson, Lacon, Ala.
Lauderdale County Soil Conservation Association, Inc., Florence, Ala.
Thompson & Grimwood, Huntsville, Ala.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Edward BURGREN, Athens, Ala.
Montgomery Limestone Co., Bessemer, Ala.

ARKANSAS

Batesville White Lime Co., Limerdale Spur, Ark.
The Lime Products Co., Huntsville, Berryville and Harrison, Ark.
Independent Gravel Co., Sulphur Springs and Rogers, Ark.
Lawrence County Limestone Co., Black Rock, Ark.

FLORIDA

Producers Rock & Lime Co., Palmetto, Fla.
The Golden Dolomite Co., Red Level, Fla.
Florida Dolomite Co., Sarasota, Fla.
Gulf Dolomite Co., Crystal River, Fla.

Marianna Limestone Co., Marianna, Fla.
Marjaz Co., Marianna, Fla.
Dixie Lime Products Co., Levy County, Fla.

GEORGIA

Willingham-Little Stone Co., Whitestone, Ga.
Dermat Shemwell & Sons, Inc., Armens, Ga.

ILLINOIS

Thornton Quarries, Thornton, Ill.
Material Service Corp., Lyons and Chicago, Ill.
Consumers Co. of Ill., Chicago, Ill.
Pontiac Stone Co., Pontiac, Ill.
East St. Louis Stone Co., E. St. Louis, Ill.
Claude Livingston, Polo, Ill.
Kingston Quarry, Kingston, Ill.
J. W. Lathers, S. Beloit, Plano and Rockford, Ill.
Lehigh Stone Co., Kankakee, Ill.
Marengo Quarries, Marengo, Ill.
National Stone Co., Joliet, Ill.
Anna Quarries, Inc., Anna, Ill.
Pattnoe Quarry, Gladstone, Ill.
Farmers Supply Co., Marengo, Ill.

INDIANA

The Erie Stone Co., Bluffton, Wabash and Huntington, Ind.

France Stone Co., Logansport, Ind.
 Pipe Creek Stone Co., Mier, Ind.
 Mid-West Rock Products Co., Greencastle,
 and Indianapolis, Ind.
 New Ross Lime Co., New Ross, Ind.
 Clifford Pope, Muncie and Albany, Ind.
 Newton County Stone Co., Kentland, Ind.
 Kosciusko Co. of Marl Dist. Ass'n., War-
 saw, Ind.
 W. H. Kessie, Columbia City, Ind.
 Paul E. Latham, Wabash, Ind.
 E. R. Small, Andrews, Ind.
 Earl McGinnis, Mier, Ind.
 Walter Coldren, Rich Valley, Ind.
 McNealy Bros., St. Paul, Ind.
 Erie & Heller, Huntington and Rockford,
 Ind.

Waveland Lime Co., Waveland, Ind.
 (Also Waveland Stone Co.)
 Meadowlake Stone Co., Wolcott, Ind.
 Rockledge Products Co., Portland, Ind.
 Montpelier Stone Co., Montpelier, Ind.
 Louisville Cement Co., Milltown and
 Speeds, Ind.
 Lutgring Stone Co., Branchville, Ind.
 Paul Franks, North Vernon, Ind.
 Bachman and Coultas, Derby, Ind.
 McCarkle Stone Co., Milroy, Ind.
 Felix A. Dunn, Ramona, Ind.
 J & K Stone Co., Elgdon, Ind.
 Straw and Siegel, Greenville, Ind.
 Monon Crushed Stone Co., Monon, Ind.
 New Point Stone Co., Batesville, Ind.
 Mrs. Kemp Copper, Brookville, Ind.
 R. G. Gilliott, Bedford, Ind.
 Ohio and Indiana Stone Co., Green-
 castle, Ind.
 Hahn, Hahn and Thompson, Freedom,
 Ind.
 Ritter Howard, Bloomington, Ind.
 Orville Combs, Bloomfield, Ind.
 Quimby & Stephen, Stanford, Ind.
 Owen & Greene Co., Freedom, Ind.
 Napoleon Lime Industry, Napoleon, Ind.
 Herman Rolland, Vevay, Ind.
 Joseph H. Bachman, Elizabeth and Cory-
 don, Ind.
 Albert A. Medough, Bedford, Ind.
 Bedford Stone Products Co., Bedford,
 Ind.
 Stonestreet Gravel Co., Angola, Ind.
 (marl)
 Ted Williams, Ellettsville, Ind.
 Cecil C. Rice, Attica, Ind. (marl)
 Howard Lane, Marengo, Ind.
 M. A. Zellers, Kewanna, Ind. (marl)
 Stonestreet & Bertzner Bros., Waterloo,
 Ind. (marl)
 Sam Perkins Farm, Ashley, Ind. (marl)
 Earl Sanxten Farm, Hamilton, Ind.
 (marl)
 Hansbarger Stone Co., Mt. Vernon, Ind.
 Elmer Jean, Campbellsburg, Ind.
 Curtis Miller, Salem, Ind.
 Ralph Jacobs Marl Pit, Laketon, Ind.
 (marl)
 Laketon Marl Co., Laketon, Ind. (marl)
 George Inman, Liberty Township, Ind.
 (marl)
 S. M. Standish, Salem, Ind.

IOWA

Dewey Portland Cement Co., Linwood,
 Iowa
 Concrete Materials and Construction Co.,
 Cedar Rapids, Earlham, Louisa County
 and Western, Iowa
 Myron Baker, Independence, Iowa
 Douds Quarries, Inc., Douds, Iowa
 Dixon Construction Co., Centerville, Iowa
 LeGrand Limestone Co., LeGrand, Iowa
 Foster Maxson, Tipton, Iowa
 Vern L. Schield, Waverly, Iowa
 Harvey Gorchers, Wheatland, Iowa
 Hewitt Bros., Fredericksburg, Iowa
 Henry Zelen, New Hampton, Iowa
 Hubert Grapes, Delhi, Iowa
 Linwood Stone Products Co., Davenport,
 Iowa
 J. D. Vernon, Eddyville, Iowa
 E. F. Schildberg, Greenfield, Iowa
 Ft. Dodge Limestone Co., Ft. Dodge, Iowa

KANSAS

E. L. Warner, Ottawa, Kan.

KENTUCKY

H. M. Derickson, Staunton, Ky.

MARYLAND

M. J. Grove Lime Co., Inc., Frederick,
 Md. (Ground Burned Lime)

MASSACHUSETTS

Lee Lime Corp., Lee, Mass.

MICHIGAN

Inland Lime & Stone Co., New Hudson
 and Manistiquette, Mich.
 Kelley Island Lime & Stone Co., Rock-
 port, Mich.
 Monitor Sugar Co., Bay City, Mich.
 (lime)
 E. L. McQuistion, LeRoy, Mich. (marl)
 Isabella Sugar Co., Mt. Pleasant, Mich.
 (lime)
 Ivan Schworm, Thompsonville, Mich.
 (marl)
 John Podoba, Traverse City, Mich. (marl)
 Louis G. LaFranier, Traverse City, Mich.
 (marl)
 E. L. LeFevre, Hesperia, Mich. (marl)
 Glen D. Cain, Grand Rapids, Mich. (marl)
 Henry Hartger, Fremont, Mich. (marl)
 S. McPerson, Fremont, Mich. (marl)
 Eugene Mack, Hesperia, Mich. (marl)
 Raymond Wyngarden, Newaygo and Fre-
 mont, Mich. (marl)
 France Stone Co., Monroe, Mich.
 Solvay Process Co., Sibley, Mich.
 Oak Dale Farm, Howell, Mich. (marl)
 Francis J. Lilak and Harold Moore, East
 Jordan, Mich. (marl)
 Agricultural Limestone Co., Jackson,
 Mich.
 Jackson Agricultural Limestone Co.,
 Jackson, Mich.
 C. H. Martin, Schoolcraft, Mich. (marl)
 Dergan's Marl Pit, Mesick, Mich. (marl)
 D. B. Haughton & Son, Benzonia, Mich.
 (marl)
 Shanehead Natural Dry Marl Pit, Do-
 wagiack, Mich. (marl)
 Marshall Straight Marl Pit, Mancelona,
 Mich. (marl)
 Thomas W. Moorman, Grandville, Mich.

MINNESOTA

E. E. Haapala, Zumbrota, Minn.
 Quarry Products Co., Rochester, Minn.
 Melvin Keilmeyer, Nerstrand, Minn.
 Fred Fakler, Winona, Minn.
 J. L. Shieley & Co., St. Paul, Minn.
 Nordquist Landers & Co., Minneapolis,
 Minn.
 G. A. Raverud, Spring Grove, Minn.
 George T. Freyer, Redwood Falls, Minn.
 Benjamin Harris, Dundas, Minn.

MISSOURI

Hamil Limestone Co., Chillicothe and
 Canton, Mo.
 O. B. McSorley, Newark, Mo.
 William Harris & Son, Piedmont, Mo.
 Fred McVey, Chillicothe, Mo.
 V. M. Threlkeld, Shelby, Mo.
 Lime Products Co., Saline County and
 Sedalia, Mo.
 Auxvasse Quarry Co., Auxvasse, Mo.
 Independent Gravel Co., Carthage, Jop-
 lin, White Bear, Phenix and Collins,
 Mo.
 Southwestern Lime Co., Neosho, Mo.
 Franklin County Soil Conservation Asso-
 ciation, Franklin County, Mo.
 C. E. Cobb, Patterson, Mo.
 Andrew County Lime Co., Savannah, Mo.
 John C. Jones, Hartsville, Mo.
 Lawrence Castle, Ottumville, Mo.
 Moniteau County Agric. Improvement
 Association, California, Mo.
 Cole County Soil Improvement Associa-
 tion, Jefferson City, Mo.
 Charles Bussen, Perryville, Mo.
 Myron Baker, Kahoka, Mo.
 Joe Wenke, Kahoka, Mo.
 E. E. Trenary, Gallatin and Trenton, Mo.
 Hohn Bramel, Washington, Mo.
 C. C. Wines, Max and Salem, Mo.
 Carl Gillespie, Monroe City, Mo.
 Randolph County Soil Conservation Asso-
 ciation, Moberly, Mo.
 R. Newton McDowell, Inc., Bernard, Mo-
 berly, Blackwater and Ravenswood,
 Mo.
 J. W. Nokes, Nixa, Mo.
 J. S. Pemberton, Rogersville, Mo.
 Weber Dehn Construction Co., Marsh-
 field, Mo.
 Columbia Quarry Co., St. Louis, Mo.
 R. B. Crenshaw Quarries, Clarksville,
 Mo.

George Adams, Ashley, Mo.
 D. M. Pearson, Louisiana, Mo.
 Federal Materials Co., Inc., Marquette
 and Cape Girardeau, Mo.
 Erwin Lanning, Houston, Princeton and
 Pattonburg, Mo.
 Russell Rock Co., Deepwater, Mo.
 G. M. Hull, Ulrich, Mo.
 Williams Rock Co., Clinton, Mo.
 Gasconade County Soil Conservation As-
 sociation, Owensville, Mo.
 Meyer Bros., Rosebud, Mo.
 Sprick Bor., Marthasville, Mo.
 Gus B. Dieckmann, Warrenton, Mo.
 E. R. Hall, Richmond, Mo.
 Carl Rose, Carrollton, Mo.
 W. D. Knoll, Salt Creek Township, Mo.
 L. B. Lyman, Shelby, Mo.
 George M. Laughlin, Kirksville, Mo.
 Scott Quarry, Ridgeway, Mo.
 Ray Childers, Sheridan, Mo.
 Clarence E. Whipple, Wheatland, Mo.
 Crawford County A. A., Steelville, Mo.
 W. B. Gibson, Hermitage, Mo.
 Riverview Stone and Material Co., St.
 Louis, Mo.
 A. W. Boenker, St. Charles, Mo.
 John R. Burton, Montgomery City, Mo.
 Ross Parnell, Halltown, Mo.
 D. L. Word, Willard, Mo.
 Donald F. Butler, Palmyra, Mo.
 W. L. Schwartz, Lecom and Nira, Mo.
 Stephens Quarry, Silex, Mo.
 Ferguson, Roanoke, Mo.
 Hunt-Bullard Limestone Co., Osceola,
 Mo.
 Raymond See, Montgomery City, Mo.
 Gordon C. Dunn, Middletown and High
 Hill, Mo.
 Earl Cockrum, Martinsburg, Mo.
 Semo Lime Co., Patterson and Williams-
 ville, Mo.
 Buckman and Cullifer, Lakenan, Mo.
 Joe Reinkemeyer, Argyle, Mo.
 Osage County Soil Improvement Assoc.,
 Lima, Mo.
 Narrows Township, Macon County, Mo.
 Kistner Dickinson, Dara, Mo.
 Buchheitt Baer, Biehle, Mo.
 Gene F. Babb, Cassville, Mo.
 T. D. Goutney, Cassville, Mo.
 E. T. Warner, Barry County, Mo.

OHIO

Southern Ohio Quarries Co., Columbus
 and Peebles, Ohio
 National Lime & Stone Co., Carey, Spore
 Lima and Marion, Ohio
 France Stone Co., Bellevue, Bloomville,
 Cloverdale, Middlepoint and Toledo,
 Ohio
 Marion Stone Co., Marion, Ohio
 Bluffton Stone Co., Bluffton, Ohio
 American Crushed Stone Co., White Sul-
 phur, Ohio
 East Liberty Stone Co., East Liberty,
 Ohio
 Scioto Lime & Stone Co., Delaware, Ohio
 Penry Stone Co., Radnor, Ohio
 S. Elizabeth Hempy, Rushsylvania, Ohio
 Basic Dolomite, Inc., Maple Grove, Ohio
 Miami Stone Co., Cuitonham, Ohio
 France Quarries Co., Bascom, Ohio
 Kelley Island Lime & Transport Co.,
 Cleveland, Ohio
 Lincoln Coal & Limestone Co., Wellston,
 Ohio
 Sugar Creek Stone Quarry, Washington,
 C. H., Ohio
 Erwin Lanning, Marion, Ohio
 Alton B. Peterson, Roscoe, Ohio
 Owens Stone Co., Ostander, Ohio
 Amesville Lime Co., Amesville, Ohio
 Mid-West Rock Products Corp., Ridge-
 ville, Ohio
 C. Raymond Grover, Bedwell, Ohio
 Marble Cliff Quarries Co., Columbus, Ohio
 Hocking Valley Stone Co., Guysville, Ohio
 Davis & Rice Stone Co., Watkins, Ohio
 George V. Helper, Sydeck, Ohio

OREGON

Oregon Portland Cement Co., Oswego,
 Ore.
 C. T. T. Leonard, Marquam, Ore.
 Limestone Products, Inc., Dallas, Ore.

PENNSYLVANIA

Ivan M. Martin, Blue Ball, Penn.

LIMESTONE DE

H. E. Millard, Annville and Swatara, Penn. (June 30) (Ground Burned Lime)
 Thomasville Lime & Stone Co., Thomasville, Penn. (Ground Burned Lime), (June 30)
 United Quarries, Inc., Winfield, Penn. (Aug. 31)
 Ivan M. Martin, East Earl Township, Penn. (Aug. 31)

SOUTH CAROLINA

Atlantic Lime Corp., Holy Hill, S. C.
 Campbell Limestone Co., Gaffney, S. C.
 Calhoun Lime Co., Cameron, S. C.

TENNESSEE

American Limestone Co., Mascot, Tenn.
 Gager Lime Mfg. Co., Sherwood, Tenn.
 American Limestone Co., Jefferson City, Tenn.
 Universal Exploration Corp., Jefferson City, Mo.

VIRGINIA

M. J. Grove Lime Co., Inc., Stephen's City, Va. (June 30) (Ground Burned Lime)

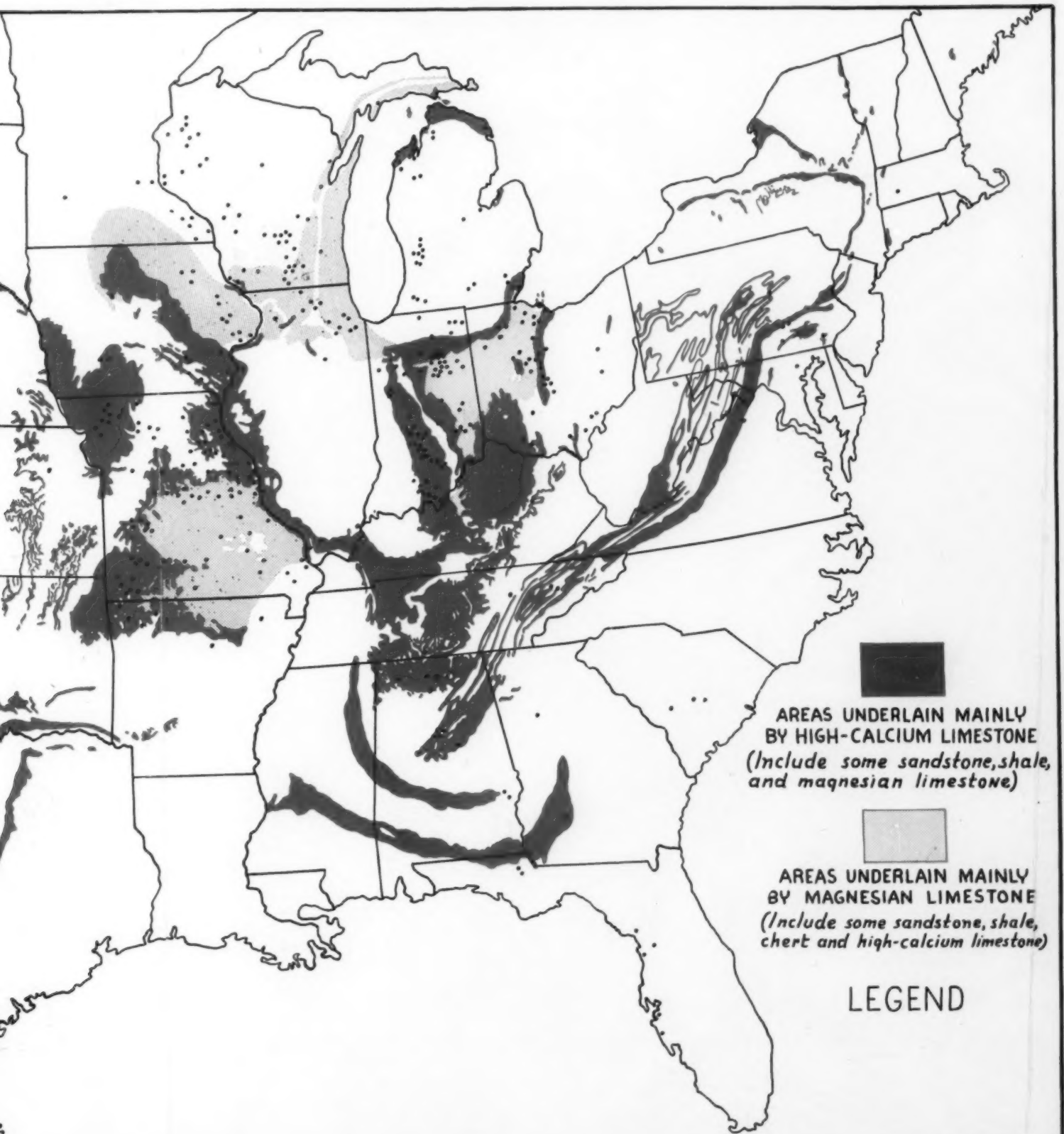
WISCONSIN

Reed Morse Budd, Fennimore, Wis.
 Norbert Neuheisel, Mondovi, Wis.
 Mayville White Lime Works, Mayville, Wis.
 Chippewa County Excavating Co., Long Lake, Turtle Lake and Stanley, Wis.
 G. Klongland Pit, Cottage Grove, Wis.
 Herbert O. Tiffany, Jr., Nelson, Wis.
 Frank H. Raemisch, Springfield Corner, Wis.
 Ed. J. Leary, Beldenville and River Falls, Wis.
 Braun Construction Co., Fond du Lac, Wis.
 R. J. Nellis, Ripon, Wis.
 Ben Micolichek, Eaton Township, Wis.
 Polk County Agric. Committee, Aniery, Wis.
 Earl Stuart, Spooner, Wis. Pits at Lozier, Whalen, Potato Lakes and Lucovsky
 M. J. Zimmerman, Oconto, Wis.
 Benny Seamans, Reedsburg, Wis.
 Rio Lime Works, Randolph, Wis.
 W. J. Durnford, Bloomington, Wis.
 Contractor; shippers are various sources of supply
 Frank Dann, Rio, Wis.
 Kutz & Valstad, Portage and Pardeeville, Wis.
 Harry R. Swan, Shell Lake and Barronett, Wis. (marl)
 Allan M. Wilcox—Chippewa County Excavating Co., Chippewa Falls, Wis. (marl)
 Arthur R. Perrenoud, Bloomer, Wis. (marl)
 Ray G. Cuff, Portage, Wis.
 A. W. Gallagher and Son, Madison, Wis.
 Allie Holtshopple, Monroe, Wis.
 Russell Carter, Juda, Wis.
 Orville Hampton, Dayton, Wis.
 W. C. Ramsey, Albany, Wis.
 Louis Finby, Deerfield, Wis.
 Elmer Evenson, Avoca and Pleasant Springs, Wis.
 Wilson Rock & Limestone Co., Wilson, Wis.
 Art Overgaard, Cambridge, Wis.
 Fred Gruetzmacher Lime Co., Nichols, Wis.
 Leon Everson, Wills Township, Wis.
 Robert Englesby, Maple, Wis.
 Erwin Lanning, Hartville and Dunne, Iowa
 Ellefson Bros., Chaseburg, Wis.

Map showing the important high-calcium and magnesium limestone deposits of the United States east of the Rocky Mountains. Dots indicate location of agricultural limestone producers having received A.A.A. Department of Agriculture, contracts during the period, December 9, 1940 to April 5, 1941



DEPOSITS OF THE UNITED STATES



Profit by the Advantages of... **RAYMOND BOWL MILL FIRING**

**IMPROVED KILN
PRODUCTION**

**REDUCED
OPERATING
COSTS**



BOWL MILL

- The modern direct-firing unit that equips your plant for lower costs
- Handles any grade of coal
- Maintains uniform grind
- Wide flexibility in control
- Saves over 25% in power costs
- No separate dryers needed
- Noiseless, dustless operation
- Record low maintenance

ROTARY KILN

- Increased kiln production
- Superior quality of lime
- Big savings in fuel costs
- Maximum burning efficiency
- Overall operating economy
- Total low cost lime production

For details of the Bowl Mill for direct-firing rotary lime kilns or cement kilns, write for Catalog No. 43



RAYMOND PULVERIZER DIVISION
COMBUSTION ENGINEERING COMPANY, INC.
1307 North Branch Street
CHICAGO

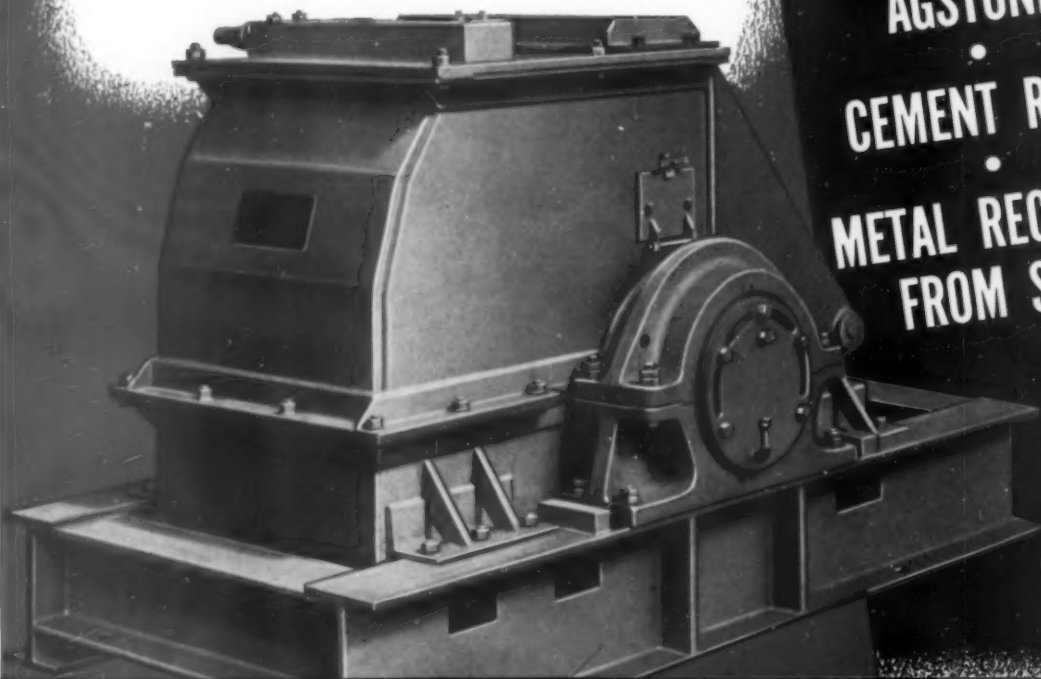
WHEN SAND PRODUCTION IS A PROBLEM

OR DEMAND EXCEEDS SUPPLY

the Symons Impact Crusher may be the solution, just as it has been for a number of producers of sand, or for making the finer sizes of industrial materials which could not be made with ordinary crushing equipment. Desired sizes of properly shaped particles, so essential for use in aggregates, are assured with this crusher. It is also the ideal machine for reshaping and converting material containing objectionable slivers, flats or slabs into a marketable product. Let us send you further particulars on the application of the Symons Impact Crusher.

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

NEW YORK CITY LOS ANGELES TORONTO LONDON
60 E. 42 St. Subway Terminal Bldg. Concourse Bldg. Bush House



Sand
from

LIME STONE
GRAVEL
SLAG
CORAL ROCK
ETC.

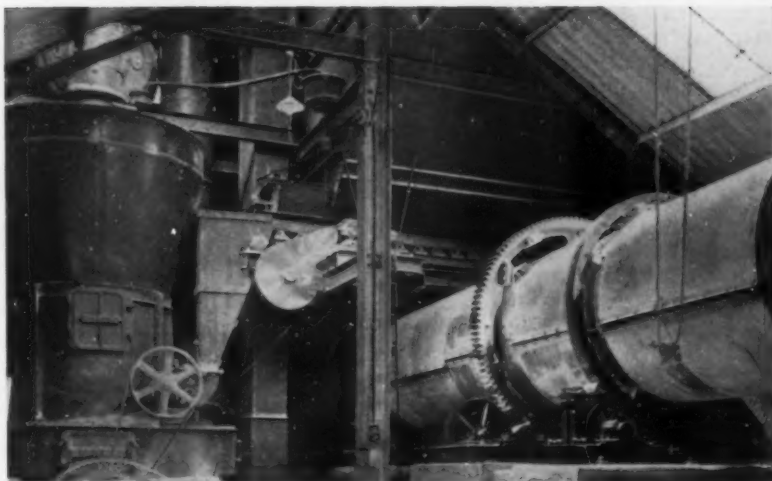
•
AGSTONE

•
CEMENT ROCK

•
METAL RECOVERY
FROM SLAG

SYMONS IMPACT CRUSHER

Ring-roll mill, to the left, receives raw whiting material after it has been dried in oil-fired dryer shown to the right



By E. F. MACTAGGART*

Making Whiting In England

Dry grinding in ring roll mill in circuit with double cone separator is modern practice. Oil-fired dryer prepares raw material

UNTIL the onset of the present World War had disturbed shipping facilities, a substantial share of the whiting or raw chalk used in the United States was imported from England and France. As this country may become increasingly dependent on its own sources for whiting, a description of the methods used in England may be of general interest. Probably the biggest outlet for whiting is the putty trade, although big tonnages are used as pigments and fillers, particularly in the rubber industry.

The whiting industry in England may be roughly divided into two groups, one in the north and the other in the south country. In general, chalk found in the south of England is very much softer than that quarried in the north, and consequently is more easily broken down.

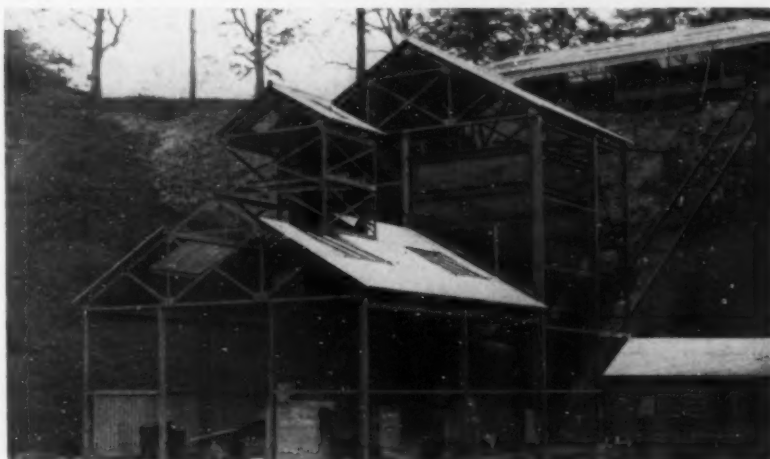
In the older plants a simple levigation treatment is given the raw material; mainly the use of a wash mill with an edge runner mill having cast iron or granite wheels to break up the harder chalk. After passing through a 20-mesh screen the slurry

is led into a series of tanks in which the whiting is allowed to settle out. Water is drained off, the material is shoveled to a drying floor of ceramic slabs with flue passages for warm air, and the whiting when dry is then cut into cakes, 4- x 8-in.

Dry Grinding Preferred

The more modern plants, however, all use dry grinding of the chalk as it is cheaper.

The choice of mill is limited, since it is apparently impossible to grind chalk in any type of ball or tube mill owing to the fact that the charge becomes a sticky mass and refuses to be reduced to a fine powder. Except for preliminary reduction, hammer mills are not used, since to get a sufficiently fine product a mechanical separator must be included in the circuit and the recirculation of oversize material reduces the capacity of the mill considerably. The same objection can be put forward for the use of pin type mills, and those mills provided with fine mesh screens. The pendul type of ring-roll mill is, therefore, being used almost exclusively and practically every plant installed has used the Raymond mill, either of the 3- or 5-roll type with double cone separator.



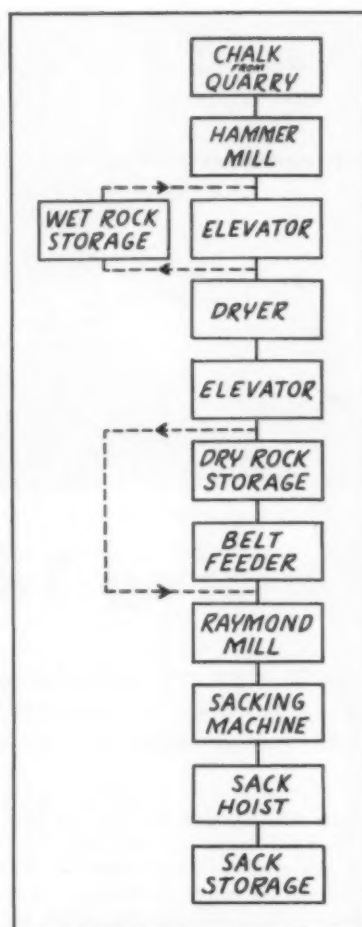
Construction view of new English whiting plant to show relative location of dryer and storage bins with inclined railway leading to bagging plant on top of the hill

*Industrial Consultant, A.R.C.S., B.Sc., A.M.I. Chem. E.

To make a uniformly fine product and keep up mill output, the chalk must be perfectly dry. Usually chalk is quarried in pieces up to about 12 in., and such run of quarry chalk even in wet weather seldom contains more than 12 percent moisture. If, however, it is smaller than this and if it is left to stand in the quarry in heavy rain, it will take up to as much as 25 percent moisture. This must be reduced to not more than 1 percent, and preferably only 0.5 percent.

Most of the previous installations of dry grinding plant made in England used a steam heated dryer, the main constructional feature of which consisted of a drum provided with baffle plates and made to rotate inside a larger drum into which steam was passed. Extra steam pipes could also be fitted in the internal drum. The wet chalk was fed into one end of the latter and the dried material passed out of the other. As might have been expected, this type of dryer had a comparatively poor thermal efficiency, although the radiation losses were lower than with a direct fired dryer owing to the temperature of the outer casing being at a lower temperature than is the case with other types of dryer. The chief advantage which was always claimed for this type of dryer was that the chalk did not come into contact with any deleterious products of combustion. It is curious that no-one had apparently taken the trouble to investigate the claims of a direct oil-fired dryer until the preliminary study for the plant now to be described was made.

The Hesse plant is situated in a very picturesque riverside site on the River Humber near to Hull, Yorkshire, where the chalk deposit is very hard. The old plant, which produced levigated whiting, is still running, and is located about half a mile from the new plant. As will be seen from the illustration, the process plant is at the foot of a cliff. This is due to the fact that the top 50 ft. or so of the chalk at this point has been worked for cement making, leaving the bottom 12 ft. of extremely pure, white chalk for the manufacture of whiting. These site conditions presented certain problems when considering the preliminary layout, since access to the quarry floor from the main road entailed going under a very low railway bridge. A second main road ran at the top of the cliff where there was a space 60- x 150-ft. As it was thought inadvisable to install heavy machinery on top of the cliff, it was decided to make a storage building at the top and connect it with the



Flow sheet of operations from quarry to storage of finished whiting

process building at the bottom of the cliff by means of a small rope railway.

Milling Process

Passage of material through the plant may be seen in the flowsheet. The maximum output when working the coarsest grades of whiting is about 3 tons per hour, and in consequence it will readily be understood that mechanical digging appliances were not justified. The chalk is quarried by barring and subsequently breaking up with sledge hammers. Although this may sound a laborious process, it is found that a ton of chalk may be taken out and delivered at the plant for about one man hour per ton. End dump trucks are used to transport the rock from the working face to the plant, where it is dumped and fed to a hammer mill. Any over-size pieces are broken with a sledge and the chalk after passing through the mill has a maximum size of $\frac{1}{2}$ in. It is elevated either to the dryer or else to a storage pile situated inside the building. The latter is only

used in emergency or very wet weather when the quarry could not be worked, and on the few occasions when it has been necessary to use it, the chalk is simply shovelled into the elevator which is provided with a second inlet on the opposite side to the hammer mill. Similarly, the operation of a flap valve at the elevator head permits the chalk to be sent either to the dryer or to storage.

The Buell dryer is of the cross pocket type having "crosses" running the length of the dryer body. By this means the wet chalk during its passage out of the dryer is turned over completely several times for each revolution of the dryer. The material is, therefore, subjected to a very thorough scouring by the hot gases.

The dryer is heated by an Urquhart Vortex atomiser type oil burner fed by gravity from a small header tank situated in the eaves of the building. This tank is in turn fed by gravity from a large storage tank at the top of the cliff. The oil supply is controlled by a Minneapolis Honeywell Pressure-trol and the temperature is kept constant by a Satchwell thermostat. The control is so arranged that in the event of the oil supply failing or the temperature falling below a predetermined figure, the compressor is shut off and the burner consequently extinguished. In practice this device has proved to be absolutely satisfactory, and during nearly twelve months running not one pound of chalk has been spoilt by the burner failing and black smoke being produced to contaminate the material.

The temperature at the outlet end does not rise about 240 deg. F. The dryer is arranged on a cum-flow principle and the hot gases are sucked through by means of a fan into a cyclone. Although the latter is quite efficient, the proximity of the plant to a golf club made it necessary to reduce any possible dust nuisance to a minimum, and consequently the outlet from the cyclone passes into a wooden duct fitted with a water spray. The duct passes into a wooden box about 4- x 6- x 10-ft. By this means practically no dust escapes into the atmosphere, and the consumption of water is negligible, it being sufficient just to crack open a valve on a $\frac{1}{2}$ -in. main supply pipe.

Milling Methods

Chalk leaving the dryer falls into one end of a small screw conveyor which takes it to a bucket elevator. This elevator is provided with a double outlet chute and flap valve, so that the dry chalk may either be

(Continued on page 60)

Burning Spalls Efficiently

Stone dimensions and shape are important factors in rate of calcination and in the design of spall kilns

SEVERAL investigations have been conducted on the calcination rate of limestone, such as those of Haslam and Smith, Furnas, and Block, but probably the most reliable is that of N. V. S. Knibbs', the summary of whose results are presented in the graph shown herewith.

The dimension of stone having the most bearing on the calcination rate is the minimum dimension, which is different from screen size. If a 6-in. lump has only a 4-in. thickness, then for the purposes of calcination it becomes a 4-in. stone. The conclusion seems to be that a 4-in. thick slab and a 4-in. ball have the same calcination time.

Curves by Knibbs', given here, are

By VICTOR J. AZBE

the most conservative; those of Haslam and of Furnas, both give a much shorter calcination time. All call for a free access of heat to the calcining limestone so that the temperature called for prevails in a form of convecting gas around the stone, which is not always the case in a lime kiln. For example, if two slabs each 3 in. thick have their faces in direct contact with no chance for gas penetrating between, calcination time will not be 2.6 hours at 2200 deg. F., as shown by the chart, but rather that of a 6-in. piece, or 8 hours.

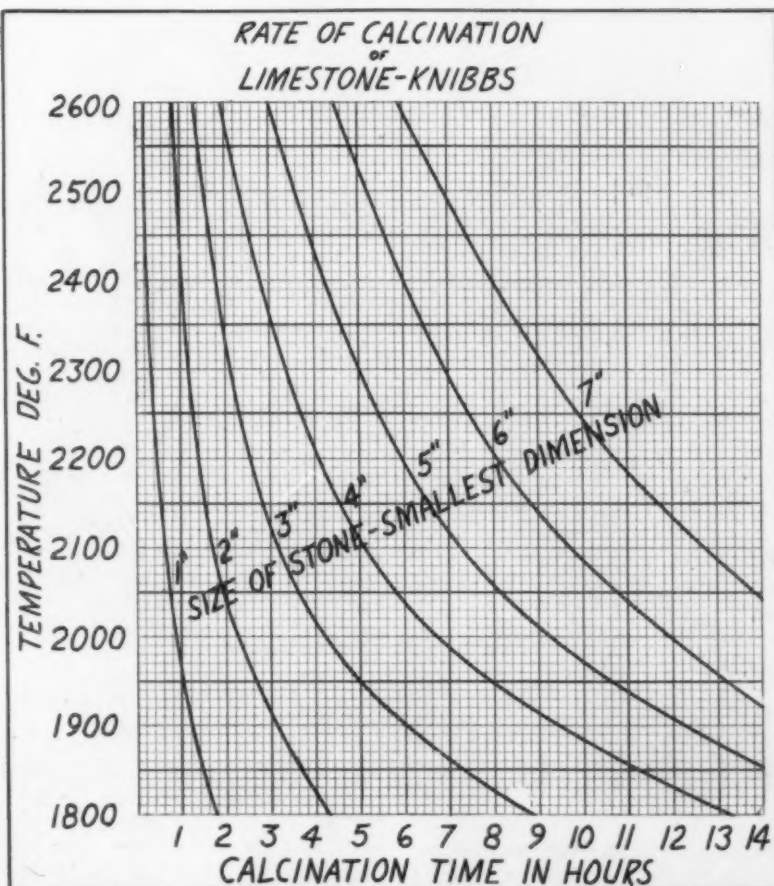
If the lime kiln charge were made

up of uniform sized balls, non-spalling, non-sanding and not subject to crushing, then the passages would remain free, an ideal state would prevail and the rate of calcination would correspond to those given by the chart and kiln capacity would be at the maximum.

However, the conditions within any lime kiln are far from ideal due either to crushing of lime under load

LIME FORUM

Mr. Azbe, consulting engineer, is a contributing and consulting editor of **ROCK PRODUCTS**. He will be glad to receive inquiries from his readers, and will answer these direct or through the columns of this Forum.



Curves by N. V. S. Knibbs which show the calcination time of various sizes of stone

or its natural sanding or spalling. Then a packed condition occurs, when relatively small pieces of calcining lime, of normally high calcining rate, become enveloped in disintegrated matter through which heat carrying gases cannot readily penetrate. Calcining time becomes longer and small stone may require on the average, a longer time than large stone.

Study of the chart shows that stone of half size requires only one-third the time for calcination, and so we may hastily assume that potential capacity under ideal conditions would be trebled. But that would be a false assumption.

It is not the surface of the lime in the kiln that counts but rather the calcination surface, the surface along the boundary between calcium carbonate and the calcium oxide; which line in an active kiln progresses continually, and as it does the surface diminishes to disappearance when the center is reached.

In any normally functioning kiln the measure of activity would be the amount of calcining surface in the hot zone at any given moment, and we must repeat that this is the surface within the lump at the boundary

of the two phases and not the outer surface of the lump. Capacity of any kiln section at a particular temperature will be proportional to the amount of this calcination surface.

Before a 6-in. lump of limestone is calcined, it is reduced to a 3-in. lump, and as a 3-in. lump the calcining surface is only 25 percent, therefore if we had started with half-size stone the calcining surface in any kiln section would be four times as great.

But as in weight, a 3-in. piece is only 12.5 percent of a 6-in. piece, and the amount of calcining matter, for example in the finishing zone of

a kiln, is only one-eighth when stone of 6-in. compared to 3-in. is used. The balance of the space at this point would be occupied by the lime. This means a waste of kiln space which is, in a measure, distinct from the rate of calcination. A 3-in. lump will burn in one-third the time of a 6-in. lump, but when they are present as core, the finishing zone will contain only one-eighth the weight of the yet to be acted upon limestone, and the rest would better be on its way out, if that was possible.

Furnas claims that penetration rate of the calcination zone is con-

stant for any given temperature. This would mean that in a period of four hours, during the first hour 59.6 percent would be calcined; the second hour, 29.6 percent; third hour, 9.1 percent; and during the last hour only 1.1 percent.

If the penetration zone of calcination were actually constant, then Knibbs' curves would turn out to be straight lines which they are not. Contrary to Furnas' claims that 3-in. core requires the same calcining period as a 3-in. piece of stone, it actually requires considerably more. Our lime kiln hot zone space where we burn out the 3-in. core is even worse; not only because its volume contains one-eighth limestone, but this limestone is insulated and heat has difficulty of access.

Prevailing higher temperatures help some, but temperatures are high because heat generation is faster than heat absorption. There is too little stone and heat has too great a difficulty of access, but combustion is going on anyway, combustion with preheated air coming up in the cooler, and so there is little wonder if damage to walls may occur, and lime surface becomes overburned.

Spall Burning

From a capacity standpoint everything argues for smaller stone; certainly 3-in. in preference to 6-in. size. But small stone in any one kiln with any given draft will not give as high a capacity as large stone in spite of its calcining rapidity. For straight spall burning, certain modifications are necessary, and these will depend not only on the initial size of stone, but also on how the lime will retain its original size as it passes through the kiln.

For any given kiln height, the draft for an equal flow of gas will be four times when stone size is reduced to half. It may even be more if the lime breaks up because it is easier to close off the voids among 3-in. lumps than 6-in. lumps.

If the height of the charge is reduced by half, draft necessarily is halved, but it is still twice as much as with 6-in., twice the height and equal capacity.

Only when the stone charge is reduced still further does capacity start to increase. Draft varies as the square of capacity; meaning, that for double capacity, four times the draft is needed. This is because friction varies as the square of velocity and for double the capacity friction, of course, is four times as great.

(Continued on page 58)

SECO VIBRATING SCREENS



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The Screen Cloth Vibrator, a patented SECO attachment, has solved a real problem for agricultural lime producers.

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Our guarantee goes with every SECO that it will do the job it is sold for.

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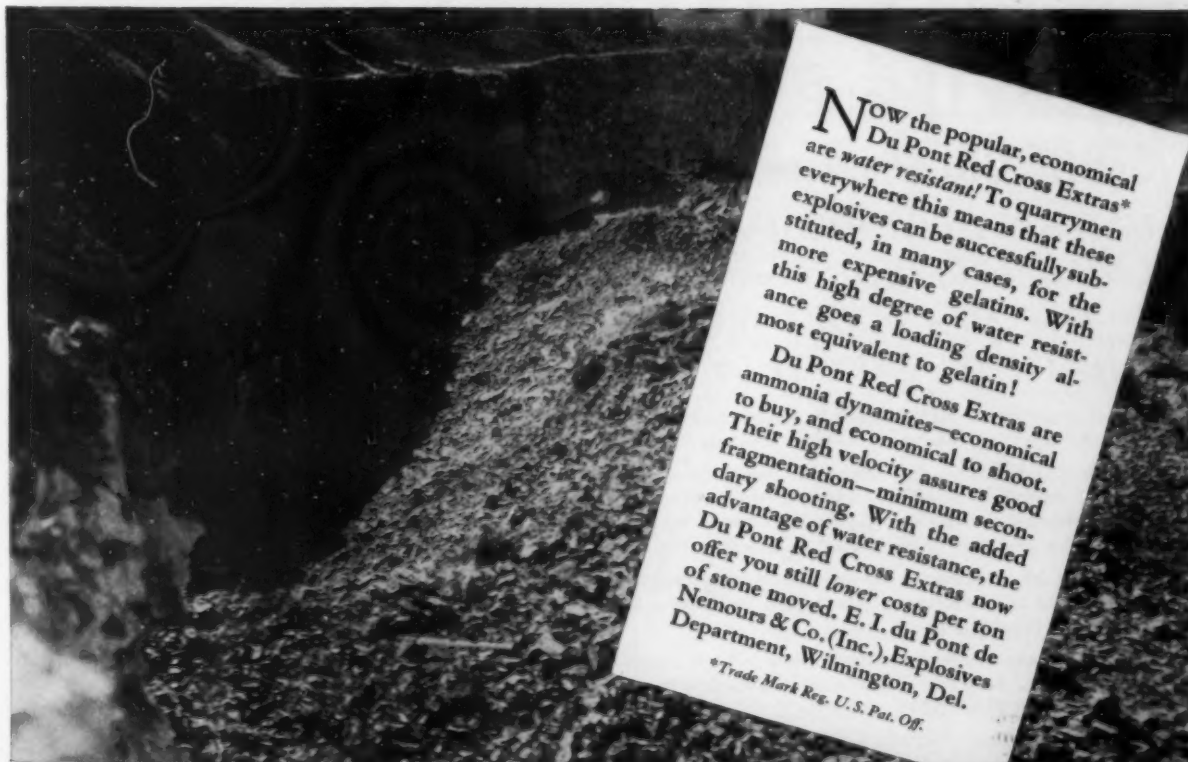
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EXPLOSIVES *and* BLASTING ACCESSORIES

A kiln of modern type with large stone of not unusually crumbly nature will produce about 60 tons of lime from a 60-sq. ft. shaft with a draft of 3-in. The same kiln with the same draft and an automatic draw to loosen the charge and move the fines will produce about 70 tons with 3 in. of draft.

In both of these cases, the active height of stone above the gas inlets would be about 37 ft. which would be sufficient for 6-in. stone, but would be far too much for stone of 3 in. or less.

If stone were half size, and the 60 or 70 tons capacity were desired, draft would have to be increased to 12 in., which for lime kiln work is an impractical high figure. Power demand would be excessive but the gases would be derived through an unnecessarily high bed.

If the charge were reduced in half, the necessary draft would also be reduced to half, and 6-in. draft is not unreasonably high and not too costly from a power standpoint.

If we assume a 6-in. draft as the maximum practicable and retain an

18-ft. stone height, small stone could be burned successfully with good capacity, but no higher capacity would be obtained than with stone double the size. No benefit is derived from increased surface for the heat absorption that small stone presents, due to the increased resistance to gas flow through small stone. It is not a matter at all of calcination time but rather of gas disposal, which is something different altogether.

It is only if we go still lower in active kiln height charge that the 6-in. draft will produce more than 60 or 70 tons of lime. One could readily figure the ratio of required shaft to kiln capacity beyond this point, but these figures would mean little as other factors, like stratification of gases flowing at high velocity, would enter and may upset calculations. It is only through trials that one can become certain, but this nevertheless is certain, that if lime is made at the calcining surface and there is more calcining surface, then if this surface is supplied with the required amount of heat, more lime will be made.

It therefore becomes apparent that any modern high capacity kiln intended to produce a ton of lime per square foot of shaft area per day with 6-in. stone, cannot produce this amount of lime with 3-in. stone.

If the kiln is of a low capacity type producing, say 1000 lb. per square foot with large stone, then this capacity can be equalled, or even increased, with 3-in. stone, provided the draft is increased. This is possible because such a kiln is not laboring at the limit of practical draft as is the case with the high capacity kiln of today.

Assuming, for example, the modern, and now fairly well accepted type of kiln with submerged offtake and 37 ft. high shaft, for lump lime this height is proven as correct when capacity is high. For spalls everything would remain the same, except that at half the height or lower, the shaft would have lateral outlets leading to the duct coming from the upper gas offtake.

While operating with spalls, everything would be open and most of the gases would leave through the lateral openings, but they would pass up through the kiln and out through the submerged offtake. Through this arrangement, the stone would arrive at the mid-gas offtake fairly well preheated, and the upper kiln portion would not be entirely wasted. The draft resistance, on the other hand, would be only that proportion of the high to the mid-offtake.

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That's one of the reasons for the constantly increasing popularity of UNIVERSALS,—the fact that they give continuous, trouble-free service without requiring attention.

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In a recent test run 6 tons of agricultural limestone were hauled 2½ miles and spread in 30 minutes. The first two spreaders made are in use today. They have spread over 100,000 tons and are still in good working order.

- Strictly a one man outfit.
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At the agricultural limestone plant of the Pounding Mill Quarry Corp., Pounding Mill, Va., where they are producing specification agstone for application in Va., W. Va., and Kentucky a JUNIOR HERCULES MILL—3 roll has produced 30,000 tons of material without any replacement of wearing parts. A real testimonial for its economy.

The JUNIOR HERCULES MILL was developed expressly for the agricultural limestone industry and is backed by 50 years of experience in the manufacturing of pulverizing machinery.

A new type feeder regulates the feed to the mill and also the finished product—assuring at all times, a uniform product. Fineness and gradation are controlled by changing the mesh of the internal screen through which the fines discharge. The feeder is electrically controlled to eliminate manual operation. Drive is either by direct connected motor or diesel engine.

Successful producers of agricultural limestone should have a mill that is low in first cost—fool proof in operation—and able to produce material to the required fineness for their particular section. The JUNIOR HERCULES MILL fulfills all these requirements.

BRADLEY
PULVERIZER CO.

Works: Allentown, Pa.

Making Whiting In England

(Continued from page 54)

passed into a 50-ton bunker or else direct to the Raymond mill. In general the former course is adopted in order that the chalk may be given an opportunity to cool so that overheating of the mill is thereby avoided.

The bunker, which is a V-bottom type, is emptied by a flat belt conveyor running close up to the bottom opening. The rate of feed to the Raymond mill is governed by a vertical weir over the feed belt, and it is op-

erated from ground level by a chain and rack-and-pinion gear. This simple device has given excellent results, since for each grade of whiting, that is to say for each predetermined output of the mill, the slide has been calibrated and once opened to the correct mark it can be left to run without further attention until it is desired to change the mill product.

A standard 3-roll high side Raymond mill with a double cone separator is used. Ground material leaving the cyclone passes into a single sack automatic bagging and weighing machine. Bagged whiting is loaded

into the cabin of the rope railway which can be controlled both from the top store and the process building. The railway is provided with stop and special safety over-run trips, and can comfortably deal with an output of three tons per hour.

Each item of plant has its own individual motor drive, and with the exception of the rope railway which is directly driven through an oil immersed worm gear, and the dryer which is belt driven, all other items of plant are operated through V-belt drives. Two subsidiary switch stations are provided, one for the Raymond mill and fan, and the other for the remaining items of plant. Isolating switches and emergency press-button stop switches are provided, and tell tale lights are fitted to all the elevating and conveyor machinery, so that in the event of a breakdown on any item of the plant, flooding can be avoided.

Storage space is provided for approximately 200 tons of bagged material, all of which is taken by truck either to the local railway depot, the docks for shipment abroad or direct to the customers.

Apart from the quarry workers, four men and a foreman can run the whole plant comfortably. One man is employed to feed the crusher, two bag off the material and load it into the rope railway, while the fourth unloads at the top. The foreman, apart from his general supervisory activities, sees to the checking of consignments, the adjustment of the mill to grind different grades of whiting, and helps with the loading of the trucks with the finished product.

Brucite Limestone In Canada

BRUCITE-BEARING LIMESTONE has been discovered in rocks of the Grenville series on both sides of the Gatineau River in Pontiac county, Quebec, about 14 miles from Hull, according to the Bureau of Mines, Province of Quebec, Canada. Other occurrences have been found in Bryson township and on Calumet Island, 80 miles west of Ottawa. If economical methods of recovery of brucite can be developed, the substance promises to be of considerable industrial value. The MgO formed by dead-burning of brucite is chemically identical with that formed by dead-burning of magnesia from any source, but the magnesia granules formed from brucite have a concentric spherical structure and magnesia in this form is useful in the manufacture of basic refractories.



Why cost-minded producers are installing *Simplicity* gyrating screens

There's nothing mysterious about the outstanding sales success of Simplicity gyrating screens in the aggregate industry. Producers are simply comparing first costs, depreciation costs, maintenance costs, and production speed of Simplicity units. And they soon see that Simplicity's give them by far the greatest value for their money.

Simplicity screens offer you a wealth of outstanding features including: Counterbalanced eccentric shaft; rubber-mounted screen corners, screens in four-way tension over doubly crowned surface, dust-sealed Alemite lubricated roller bearings; extra rugged construction.

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Right: A 5'x12' Model D double deck Simplicity gyrating screen.

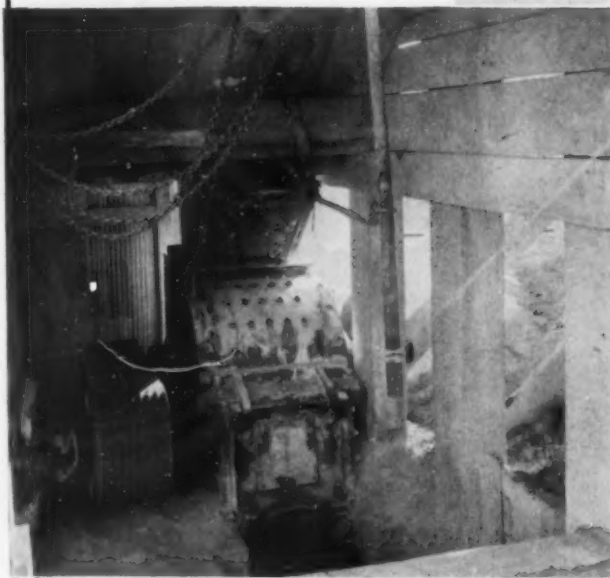
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Let us send you our latest illustrated Bulletin "TWO-IN-ONE" Lime Stone and Rock Crushers also booklet entitled "Folks and Fields Need Lime"—Consult our Engineering Department for any information on any Plant Set up.



Cross Section View of Pulverizer

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installation, backed up by many single unit installations, tell the story of their superiority. These installations are time-tried evidence of continuous operation without shut downs and subsequent loss of labor-time and output. Our engineers will gladly show how Sturtevant mills can increase your operating efficiency.



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Moto-Vibro Screens . . . screen anything screenable

Ring-Roll Mills . . . very durable, small power

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Rotary Fine Crushers . . . for intermediate and fine reduction



Jaw Crushers



Rotary Fine Crushers



Crushing Rolls



Ring-Roll Mills



Moto-Vibro Screens



Swing-Sledge Mills

NEWS

ABOUT PEOPLE

B. W. CRENSHAW, general manager of the Cooley Gravel Co. plant at Sampsel, Mo., for the past four years, has become works engineer for the Scullen Steel Co., St. Louis, Mo.

R. M. CRAIGMYLE has been elected a vice-president and director of Giant Portland Cement Co., Philadelphia, Penn., succeeding Walter L. Haehnlen, resigned.

ROBERT KINZIE, JR., has been named permanent superintendent of the Santa Cruz Portland Cement Co. plant at Davenport, Calif. Mr. Kinzie had been acting superintendent since the death of Joseph Riordan, former superintendent. Mr. Kinzie, who was born in Alaska in 1903, is the son of Robert Kinzie, superintendent of the Treadwell mines. He came to California in 1914, and was graduated from the University of California. His first job with the company was as a salesman in the oil field area. In 1931 he came to Davenport as cement chemist.

F. J. LOHMEIER, manager of the Missouri Gravel Co. at Louisiana, Mo., for the past 11 years, has been transferred to Barry, Ill., to manage the company's plant at this location.

CHARLES GARTNER, maintenance superintendent for over 37 years at Hannibal, Mo., plant of Universal-Atlas Cement Co., has retired. Employees and officers of the plant honored Mr. Gartner with a party at which he received a number of gifts.

BEN C. REYNOLDS, president of the Independent Gravel Co., Joplin, Mo., was recently elected president of the Joplin Chamber of Commerce.

E. P. MULLER, formerly with Marblehead Lime Co., has joined the staff of the Ash Grove Lime & Portland Cement Co. Clay W. Lewis of Marblehead has been assigned to special duties, and is now located at Hannibal, Mo., where he is supervising the construction of a new mineral feed building.

HENRY A. RENINGER, who is well-known throughout the cement industry as director of safety and welfare of the Lehigh Portland Cement Co., and as perhaps the most active member of the Portland Cement Association's Committee on Accident Prevention and Insurance, is now in active service with the army as Lieutenant Colonel at Indiantown Gap



Col. Henry A. Reninger

Military Reservation near Harrisburg, Penn. He is adjutant general of the 28th Division. Col. Reninger recently celebrated his 25th anniversary as a member of the PCA committee.

GEORGE W. BALLANTYNE has been named secretary of the Ideal Cement Co., Denver, Colo. He succeeds the late R. J. Morse. Mr. Ballantyne joined the company as an accountant in 1921, and in 1932 became assistant secretary and treasurer.

ROBERT L. CLAUSE, executive vice-president, Pittsburgh Plate Glass Co., has been elected president, succeeding H. S. Wherrett, who has assumed the new position of vice-chairman of

the board of directors. The Columbia Cement Division is an important branch of this company's widespread interests.

HARRY E. POST, president of the Seminole Rock & Sand Co., Miami, Fla., was one of those injured in a recent airplane accident in Florida. He suffered a broken leg.

F. E. TYLER has been elected chairman of the board, Dewey Portland Cement Co., Kansas City, Mo., having been elevated from the office of president and manager. W. E. Tyler, the new president, was formerly first vice-president and treasurer; D. M. Tyler, formerly works manager and purchasing agent, becomes first vice-president; R. W. Moore, secretary and traffic manager, becomes vice-president, secretary, and treasurer; Walter Gray, sales manager at Kansas City, is now vice-president; L. J. Capen, sales manager at Davenport, Iowa, has been elected vice-president, and M. V. Ward is the new auditor and assistant treasurer.

J. K. BILLINGS, superintendent of the Peerless White Lime Co., Ste. Genevieve, Mo., for 21 years, is now the superintendent of the Gager Lime Manufacturing Co., Sherwood, Tenn.

STANTON WALKER, director of engineering, National Sand and Gravel Association and National Ready Mixed Concrete Association, Washington, D. C., who a year ago was appointed by the board of the American Concrete Institute to fill a vacancy, was this year elected to succeed himself. John W. Kennedy, Huron Portland Cement Co., Detroit, was elected to succeed A. S. Douglass, Detroit Edison Co., Detroit, Mich., as a director.

GEORGE H. DENT has been appointed district engineer at the Washington, D. C., office of the Asphalt Institute. Mr. Dent has served with the Maryland Road Commission in various capacities, and his most recent work was with the Civil Aeronautics Administration as paving engineer for the North Atlantic Division.

R. M. CRAIGMYLE, Ernest J. Capen, Herbert C. Hauth, Alexander Pinney and Walter C. Beecken were recently elected directors of Giant Portland Cement Co., Philadelphia, Penn. Charles F. Conn, Evan Randolph, Charles J. Rhoads, and J. Willison Smith were reelected.

(Obituaries appear on page 109)

Law of Size Distribution

A study of the theory of grinding as a phase of the problems dealing with surface area measurement of cements and cement raw materials

By STEWART S. FRITTS, M.E.*

CALCULATION of surface area and particle size distribution based on equation (1), shown in the box, is rather long and tedious, and from a practical standpoint the application of the proposed law of Turbidity vs. Particle Size would be too involved. It has been found, however, that the Mean Particle Size of the 0-7.5 micron fraction and the Surface Mean Diameter for any Limiting Particle Size bears a direct relation to the parameter "b" of equation (1). Thus it is only necessary to plot values of Turbidity ($\log I_0 - \log I_d$) against the reciprocal of the particle size on semi-logarithmic paper and determine the slope of the line from which the value of "b" is readily calculated.

Fig. 1 shows the relationship between the Mean Particle Size of the 0-7.5 micron fraction and the parameter "b". This curve was prepared from the following table and the calculations were based on an assumed normal distribution:

TABLE I.
TABULATED VALUES OF MEAN PARTICLE SIZE (0-7.5) MICRON FRACTION AND PARAMETER "b".

Parameter "b"	Mean (0-7.5)
0.5	1.17
1.0	1.81
1.5	2.25
2.0	2.62
2.5	2.91
3.0	3.16
3.5	3.37
4.0	3.56
4.5	3.73
5.0	3.88
5.5	4.02
6.0	4.15
6.5	4.27
7.0	4.39
7.5	4.48
8.0	4.57
8.5	4.65
9.0	4.73
9.5	4.80
10.0	4.87

By means of the foregoing relation it is possible to more nearly approximate the actual mean diameter of the 0-7.5 micron fraction than that of the assumed mean diameter of 3.75 microns. It is of course necessary to make corrections in the Wagner equation to account for the

INTRODUCTION

A LAW OF SIZE DISTRIBUTION AND ITS RELATION TO TURBIDIMETRIC ANALYSIS

The equation that forms the basis of this investigation is written as follows:

$$y = a e^{-b/d} \quad (1)$$

Where $y = \log I_0 - \log I_d$
 a = experimental constant
 b = experimental parameter
 e = Napierian logarithm base = 2.718
 d = diameter of particle in microns

Values for "a" and "b" may be determined analytically if y is known for any two values of d . Hence the parameter "b" may be found from the following equation:

$$b = \frac{2.303}{\frac{1}{d_2} - \frac{1}{d_1}} (\log \log I_{d_1} - \log \log I_{d_2}) \quad (2)$$

Where d_1 and d_2 are particle sizes in microns, and $\log \log I_{d_1}$ and $\log \log I_{d_2}$ are the logs of the turbidimetric values corresponding to the particle sizes.

However, the better solution is by means of graphical methods in which case equation (1) may be written as follows:

$$\log y = \log a - \frac{1}{2.303} \frac{b}{d} \quad (3)$$

By plotting values of log turbidity or $\log(\log I_0 - \log I_d)$ against $1/d$ on semi-logarithmic paper and drawing a straight line through the points the values of the constant "a" and the parameter "b" are obtained. The intercept on the log y axis is $\log a$ and the slope is $-0.4343 b$.

change of the calculated particle size.

The surface area is then given by the following equation:

$$S_{90} = 38.1 \times \% \text{ minus } 325 \times (2 - \log I_{90}) \quad (4)$$

Where $\Sigma (2 - \log I_d) =$

$$0.4 d_{m7.5} + (1.75 - 0.2 d_{m7.5}) \log I_{7.5} + 0.75 \log I_{10} + \log I_{15} + \log I_{20} + \log I_{30} \dots \log I_{100} - 11.5 \log I_m$$

and $d_{m7.5}$ = mean particle size of (0-7.5) micron fraction.

Fig. 2 shows the relationship between the Surface Mean Diameter of

the material below the 325-mesh separation and the parameter "b". Because of the uncertainty of the actual separation value of the 325-mesh sieve, curves have been prepared for the limiting particle sizes at 60, 55, 50, and 45 microns. These curves were prepared from the following table and the calculations were based on the same distribution function as applied to the previous table:

TABLE II.
TABULATED VALUES OF SURFACE

Mean Diameters = d_m and Parameter "b".

Parameter "b"	Surface Mean Diameters at the Limiting Particle Sizes			
	60	55	50	45
0.5	2.13	2.00	2.05	1.99
1.0	3.63	3.55	3.46	3.36
2.0	5.98	5.83	5.66	5.47
3.0	7.85	7.62	7.38	7.11
4.0	9.46	9.17	8.85	8.51
5.0	10.89	10.53	10.15	9.73
6.0	12.17	11.75	11.30	10.82
7.0	13.34	12.87	12.36	11.81
8.0	14.41	13.88	13.32	12.71
9.0	15.40	14.82	14.20	13.53
10.0	16.32	15.70	15.02	14.29

The total surface area of the material less than the 325-mesh separation is determined from the following expression:

$$S_{325} = \frac{600 \times \% \text{ minus } 325}{\text{Sp. gr.} \times d_m} \quad (5)$$

For cements having a specific gravity of 3.15 the foregoing equation reduces to:

$$S_{325} = \frac{190.5 \times \% \text{ minus } 325}{d_m} \quad (6)$$

The Wagner (1) equation for the determination of the surface area of cement is based on the assumption that the 325-mesh sieve separates at 60 microns. Experimental evidence (2) (3) has indicated that the separation is nearly 45 microns or close to the aperture of the screen which is designated at 43 or 44 microns. In some recent work it has been found that the 325-mesh sieve separates at 53 microns. Some laboratory ground

* Research and conservation engineer, Lone Star Cement Corporation.

cements, commercial mill products, as well as the crushed clinkers by the Portland Cement Association type grindability (4) testing apparatus has shown a separation at 53 microns. Mathematically this means that the average diameters of particles just passing a 325-mesh sieve with an opening of 44 microns on a side are equal to 1.207 times the sieve aperture. Or in other words the average diameter of particles just passing a sieve are equal to the mean between the inscribed and circumscribed diameters of the sieve aperture.

Testing Equation

In order to test equation (1) or the proposed law of Turbidity vs. Particle Size many turbidimetric analyses

CHEMIST'S CORNER

Problems and practices of the chemists in the industry are discussed on these pages. Contributions and comments are invited.

were considered. However, for the purpose of examination, the plots of eleven samples of material are shown in Figs. 3 to 13. These materials cover a fineness range from the crushed clinker produced by the Portland Cement Association grindability (4) testing apparatus to the fairly high-early-strength cements ground in open and closed circuit, as well as two types of cement raw materials.

The particle size distributions, surface mean diameters and surface areas are shown in Table III, and identified as follows:

TABLE III—TABULATED PARTICLE SIZE DISTRIBUTIONS, SURFACE MEAN DIAMETERS AND SURFACE AREAS BASED ON TURBIDIMETRIC ANALYSES

Sample	LG	HC	HO	LS	CR	RL	TS	GN	BC	GB	SS
(0-7.5)	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
55 μ	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
50	98.1	100.	98.5	98.1	98.9	100.	93.5	96.5	93.6	92.1	96.4
45	95.8	100.	97.9	95.4	96.9	99.2	82.9	93.3	85.5	82.0	92.5
40	93.1	98.6	95.4	92.3	94.2	98.4	73.3	86.2	80.3	72.9	87.9
35	87.7	93.6	93.7	89.0	90.3	96.0	58.7	80.4	73.5	62.4	82.8
30	79.3	89.4	91.8	84.3	85.9	91.8	47.3	72.4	66.0	52.6	77.0
25	74.0	81.3	81.5	79.7	82.8	84.3	37.7	60.2	57.0	42.0	70.6
20	67.1	69.6	70.3	73.1	76.7	73.8	29.8	50.9	46.9	29.9	62.3
15	56.6	58.7	56.9	65.8	68.6	58.3	26.4	40.0	35.2	21.6	52.5
10	44.9	42.0	43.2	57.8	57.1	41.2	19.8	26.7	22.9	11.9	39.2
7.5	38.5	34.5	36.0	52.6	49.5	31.8	16.7	20.6	16.2	8.1	30.9
Σd_m	7.36	7.62	7.40	6.04	6.18	7.83	13.4	10.6	12.0	17.0	6.34
SA_g	2585	2500	2575	3325	3705	2430	1415	1800	1590	1125	2285
-325	95.7	99.2	98.5	68.1	81.6	99.8	59.0	58.5	33.5	14.0	88.9
SA_n	2475	2480	2535	2470	3025	2425	895	1055	530	167	2030
(0-7.5)	2.90	3.30	3.20	2.22	2.51	3.42	3.04	3.73	4.00	4.50	3.28
55 μ	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
50	98.0	100.	98.5	97.6	98.7	100.	93.3	96.5	93.7	91.2	96.2
45	95.6	100.	97.7	94.2	96.3	99.2	82.2	93.3	85.7	82.2	92.1
40	92.6	98.4	95.1	90.3	93.1	98.5	72.2	86.2	80.6	73.1	87.3
35	86.6	93.4	93.3	85.9	88.4	96.0	57.1	80.4	73.8	62.9	82.0
30	77.4	89.0	91.2	79.9	84.3	91.7	45.4	72.4	66.4	53.3	76.0
25	71.6	80.5	80.4	74.1	79.4	83.9	35.5	60.2	57.5	42.8	69.4
20	64.1	68.2	68.6	65.8	72.1	73.1	27.4	50.9	47.5	30.9	60.7
15	52.6	56.9	54.5	57.7	62.4	57.1	23.9	40.0	35.9	22.8	50.5
10	39.7	39.5	40.1	46.4	48.7	39.5	17.1	26.6	23.7	13.3	36.7
7.5	32.6	31.7	32.5	39.6	39.6	29.8	13.9	20.5	17.1	9.6	29.1
Σd_m	6.71	7.31	7.01	4.75	5.16	7.61	13.0	10.6	12.1	17.2	8.02
SA_g	2835	2605	2715	4610	4435	2505	1465	1800	1570	1110	2375
-325	95.7	99.2	98.5	68.1	81.6	99.8	59.0	58.5	33.5	14.0	88.9
SA_n	2715	2585	2675	3140	3620	2500	865	1055	525	155	2110

Note: In the above Table, Particle Size Distributions are Gross. To find Net values multiply by 325-mesh finenesses.

Σd_m = Surface Mean Diameters of the (0-55) micron fraction.

SA_g = Gross Surface Areas of the (0-55) micron fraction.

-325 = Fineness of material passing a 325-mesh sieve.

SA_n = Net Surface Areas of the minus 325 mesh fraction.

Sample LG. A laboratory ground clinker in a 12- x 12-in. batch-type tube mill. Dispersion effected by a modified procedure. Instrument calibrated by means of a "mask" method.

Sample HC. A high-early-strength cement ground in closed circuit with air classifiers. Dispersion and instrument calibrated by means of "standard" method.

Sample HO. A high-early-strength cement ground in open circuit. Similar to sample HC.

Sample LS. A hard limestone ground in open circuit in a commercial-type combination tube mill. Dispersion effected in an aqueous solution with so-

dium silicate as a dispersing agent. Instrument calibrated by means of a "mask" method. Time intervals by means of a stop watch calculated from viscosity-temperature relations for water. Specific gravity of material equals 2.74.

Sample CR. A soft, argillaceous limestone known locally as "cement rock" ground in open circuit in a commercial-type combination tube mill. Dispersion and calibration as in sample LS. Specific gravity of material equals 2.62.

Sample RL. Cement Reference Laboratory No. 3 high-early-strength cement. Dispersion effected by a modified procedure. Instrument calibrated by means of a "mask" method.

Sample TS. A "tailings" product from a closed circuit grinding operation. Dispersion effected by a modified procedure and instrument calibrated by means of a "mask" method.

Sample GN. A product from a single-roll and ring preliminary-type pulverizer. Dispersion effected by means of a modified procedure and instrument calibrated by means of a "mask" method.

Sample BC. A product from a 3-roll and ring preliminary-type pulverizer. Dispersion and calibration by means of "standard" procedure.

Sample GB. A crushed clinker produced by a Portland Cement Association grindability (4) testing apparatus. Dispersion effected by a modified procedure. Instrument calibrated to $I_n = 31.6$.

Sample SS. A "standard" cement sample (U. S. Bureau 114b). Dispersion effected by means of a modified procedure. Instrument calibrated by means of a "mask" method.

Various Materials Respond to Different Grinding Methods

It is interesting to note from Table III how the recalculated (0-7.5) micron fraction affects the particle size

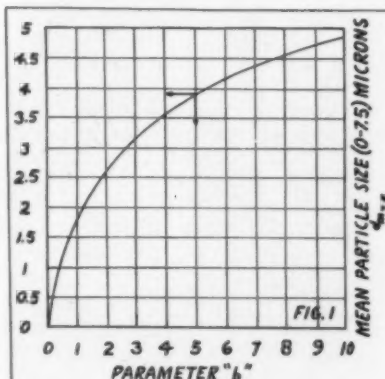
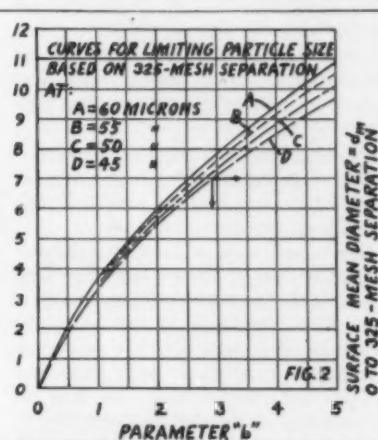
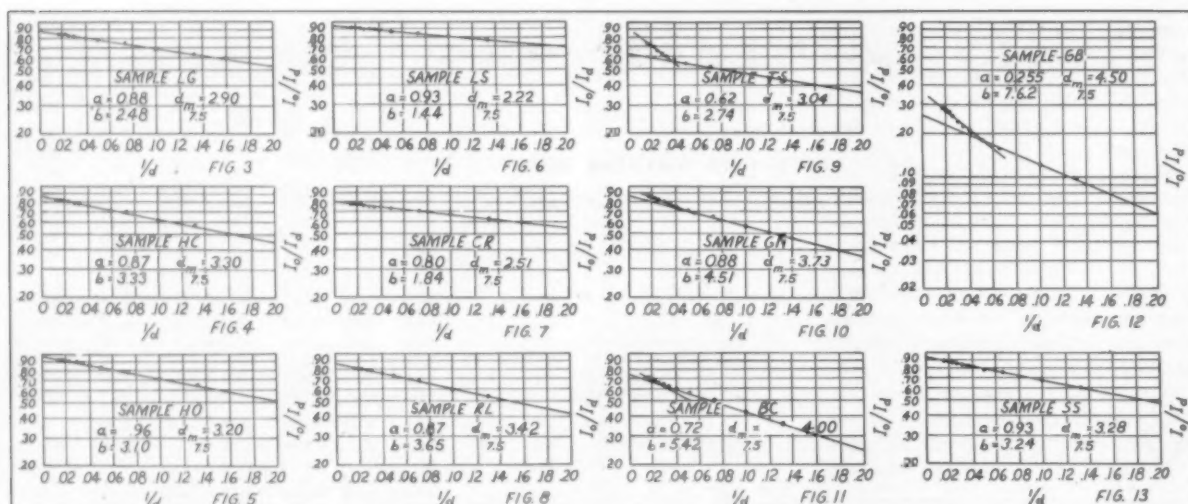


Fig. 1: Curve showing relationship between mean particle size (0-7.5) micron and parameter "b" of the equation $Y = ae^{-b/d}$. Fig. 2: Curve showing relationship between surface mean diameter d_m and parameter "b" of the same equation referred to in Fig. 1





Figs. 3-13: Plots of 11 samples of material covering a fineness range from crushed clinker produced by P. C. A. grindability testing apparatus to the high-early-strength cements ground in open and closed circuit and two raw materials

distributions, surface mean diameters and surface areas. A decrease in the average (0-7.5) micron fraction decreases the value of the percentage less than 7.5 microns, decreases the surface mean diameters, and increases the surface areas.

In comparing samples LG, HC and HO, the ordinary analysis shows that the surface areas are about the same. However, by the modified analysis LG shows a much higher surface area due to the fact that the average 0-7.5 micron fraction is smaller.

HO in comparison to HC shows a difference of 55 sq. cm. per gram for the ordinary analysis and 90 sq. cm. per gram for the modified analysis. This difference could easily account for a difference in strength producing characteristics of a cement ground in open circuit as against a similar cement ground in closed circuit to practically the same fineness as shown by the ordinary methods.

Sample LG shows a relatively high surface area, but a rather peculiar gradation. The 0-7.5 fraction is fairly high but the gradation up to 30 microns is decidedly low in comparison to similar types of cement ground in open circuit as HO. It is generally recognized that laboratory ground cements do not perform in the same manner as commercial mill products. An examination of the particle size distributions may throw some light on the reason for these apparent differences.

Samples LS and CR are especially interesting because they show the grading characteristics of cement raw materials. While LS is considered a very hard grinding limestone it nevertheless shows a higher fineness in terms of surface mean diameters, than the comparatively easy grinding

"cement rock." Experience with the grinding of these materials shows that the material CR breaks down quite readily and it is not especially difficult to eliminate critical particle size in terms of plus 100-mesh material. On the other hand, LS is resistant to the elimination of critical particle size. Both of these materials should respond readily to the treatment of air classification and thus reduce the problem of "oversize" material without an undue amount of minus 0-7.5 micron material which could be very easily lost during the burning process.

An air elutriation analysis showed that LS had 29.3% less than 10 microns and CR had 41.3% less than 10 microns. The Wagner analysis with the calculated 0-7.5 micron fraction showed 31.6% for LS and 39.6% for CR respectively. On the other hand the Wagner analysis without any modifications showed 39.4% for LS and 46.6% for CR.

Sample RL is included in this analysis because of the interest that may be shown in this material at the present time.

Sample TS is a "tailings" product from a closed circuit grinding operation. This material is especially interesting because it shows a "primary" and "secondary" distribution function. In an analysis of this type it is necessary to determine the distribution function at or near 7.5 microns and substitute the value for $d_{m\ 7.5}$ in equation (4) and thus calculate the surface area. TS may be considered as "dirty" tailings, i.e., it contains a relatively large amount of 0-7.5 micron material. The modified analysis may thus be useful in analyzing the performance of air separators

and closed circuit grinding operations in general.

Samples GN and BC are similar to TS in that a "primary" and "secondary" distribution function is shown. These materials are relatively coarse so that a modification of the Wagner analysis does not show any great difference.

Sample GB is a grindability product and is about the coarsest material subjected to Wagner analysis. Here again is found a "primary" and "secondary" reduction function.

Sample SS is "standard" sample 114b. In the analysis shown in Table III the distribution function has been considered normal with the equation defined by a single parameter.

In ordinary cement grinding either with open or closed circuits, normal distribution functions will be encountered. Naturally, the law of Turbidity vs. Particle Size will not hold for abnormal distributions. Conversely, the ordinary Wagner analysis will fail and it therefore becomes necessary to resort to other methods of fineness determinations.

Frequently, it will be found that particulate materials break down into a "primary" and "secondary" distribution function as shown above. It is therefore necessary to treat these functions separately. Under this category will be found the products of coarse crushing and grinding operations and possibly some air separated materials. Finely ground products usually assume a normal distribution with a complete analysis determined from a single equation. In fact some of the more finely divided materials, such as high-early-strength cements plot to the normal distribution function better than the coarser products.

(Continued on page 90)

A "Dry Land" Dredge

All-steel structure combines washing and conveying of sand and gravel materials by means of pipe and dredge type pump

By H. M. TIPPIN*

AT DAUGHERTY, OKLA., the Makins Sand and Gravel Co., is operating a new plant which employs unusual methods. It is in effect a "dry land dredge" operation in that the

materials are handled throughout the processing as a pulp by means of pumps and by gravity.

Material is excavated from an alluvial deposit on Rock Creek in the



Sand is removed at the tipple by gravity screen and is dewatered by the screw washer which may be seen to the left

heart of the Arbuckle Mountains by a 1-cu. yd 206B P & H gasoline engine powered dragline, loaded into Ford trucks, and hauled to the plant. Truck haul is about 300 ft. from the plant. The deposit ranges from a concrete sand up to boulders 8-in. in diameter. Sand is very sharp and abrasive, and the coarse material is a limestone gravel.

At the plant the trucks drive up an incline and over a rail-type grizzly above a reinforced concrete sump pit. Material dumped over the grizzly passes onto an inclined gravity screen with 3-in. square openings, the oversize going to a 15- x 36-in. Diamond

At the top of the plant is a 4- x 8-ft. single-deck vibrating screen which sculps out oversize to be chuted to a jaw crusher, the throughs passing to a 3- x 8-ft. triple deck sizing screen



To the left, truck dumping material to grizzly scalper. Material passing gravity screen below is pumped to top of screening plant. Note pipe to right which returns water to sump

jaw crusher. Gravity screen throughs go direct to the sump pit, and the crusher product also is washed into the pit by overflow water from the top of the plant.

From the sump pit, the material is elevated in a pipe to the sand tipple by means of an 8-in. Amsco pump driven by a 150-hp. Allis-Chalmers induction motor. At the sand tipple a gravity screen removes the sand which drops into a sand hopper where it is graded. From the hopper, the sand passes to an Eagle single screw washer from which the cleaned product drops into the sand bin of 40-ton capacity. Overflow water from the washer is returned to the sump pit by a 10-in. pipe passing over the grizzly and back of the crusher. In this way it also serves to wash the material into the pit. Hydraulic water is supplied by a 5-in. Gould pump located at the creek.

Gravel removed in the sand tipple at the top of the plant goes to a 4- x 8-ft., single-deck Tel-smith vibrating screen which separates out the oversize which is chuted to a 9- x 36-in. Diamond jaw crusher and then back to the sump pit for recirculation. Throughs from the single-deck vibrating screen pass to a 3- x 8-ft. triple-deck Tel-smith vibrating screen where the various sizes are graded and placed into three steel bins, each of 60-ton capacity.

*General superintendent, Makins Sand and Gravel Co., Oklahoma City, Okla.



Reclaiming conveyor below bins carries material to loading out bin, to the left. At the ground level in the center is the small jaw crusher which reduces oversize from the screen above and chutes the product to the sump for recirculation

Under these three bins is a 24-in. Dodge belt conveyor, 80-ft. centers, which carries material up an incline to the top of a separate steel bin having a capacity of 40 tons. This arrangement permits blending into various grades to meet any specification.

Excess material from this bin and the sand bin is removed by trucks to stockpiles on a rail siding one mile from the plant where approximately 1000 carloads are kept for shipment.

The main plant, which occupies a space of only 30- x 100-ft., was designed and built by the Makins Sand and Gravel Co. Plant capacity is approximately 150 tons an hour.



Dragline removing material from alluvial deposit

In addition to the new Daugherty plant, the company operates a gravel plant at Sulphur, Okla., which was described and illustrated in *Rock Products*, February 25, 1933, pp. 20-23, and a sand plant in Oklahoma City. Ready mixed concrete is an important part of the business in Oklahoma City, and a modern batching unit and transit mixers are used in this service.

Industrial Sands in Ohio

GEOLOGICAL SURVEY OF OHIO has published reprint series No. 2 from *The Ohio Journal of Science* on "Glass Sands and Molding Sands," by J. A. Bownocker. The pamphlet

deals with the geology of the important glass sand and molding sand deposits in the State, gives the production figures and the specifications for the manufacture of various kinds and qualities of glass.

Each of many deposits over the State is discussed separately, with emphasis on the chemical composition, extent, occurrence and, in many cases, the manner of operation of commercial plants working the particular deposits.

More Companies Making Agricultural Limestone

ISAAC SNYDER has been operating an agricultural limestone grinding plant north of Pella, Iowa, on the Grundman farm. He has been supplying ground limestone for Marion, Jasper, and Mahaska counties.

ELLEFSON BROS., Alma, Wis., have been awarded the contract for grinding A.A.A. grant-of-aid limestone under the 1940 program. The crushing capacity of their plant now operating in the Passow quarry at Lincoln, Wis., is 300 tons a day.

THE HAMILL LIMESTONE CO., Canton, Mo., has set up a crusher on the Ben Johnson farm to produce agricultural limestone under the A.A.A. program of the federal government. Production is about 235 tons a day.

W. P. MAUTZ, of the Effingham, Ill., contracting firm of Mautz and Oren, has started grinding limestone at his new quarry one mile south of Gilmore, Ill. The hammermill has a capacity of 20 tons an hour.

HAMILL LIMESTONE CO. expects to renew its contract to operate the quarry at Linneus, Mo., producing 200 tons a day of crushed limestone for agricultural purposes.

LEE COUNTY's old limestone mine near the Terrell county line near

Dawson, Ga., will soon be opened to produce agricultural limestone. Before the Civil War the mine was operated to supply a lime kiln.

Open Catalina Quarries For Defense Work

QUARRIES on Santa Catalina Island off the Southern California coast expect to open soon to meet national defense demands. Two concerns, the George Pollock Co., and Guy F. Atkinson Co., have been accorded harbor facilities at the quarries. An in-shore rock mole is planned in connection with the naval air base work and a huge amount of rock will be needed in other work planned in the Long Beach harbor.

Cement a By-Product of H₂SO₄ from Gypsum

I. G. FARBEINDUSTRIE A. G. in Germany has built a plant to produce sulphuric acid from gypsum at its Wolfen Works. It has an annual capacity of 80,000 metric tons of acid and 75,000 tons of cement, according to the U. S. Bureau of Mines. This plant has military importance owing to the difficulty of importing pyrites under war and shipping conditions and lack of foreign exchange.

The process now perfected was first developed during the World War. In addition to gypsum or anhydrite, the process requires coke and clay. The gypsum breaks down and the residue of CaO combines with the silicates of the clay to make a cement clinker, which, by grinding, becomes a usable grade of cement. As Germany has suffered recently from a cement shortage, it is hoped to increase the national supply with this by-product cement.

War Increases Mica Demand

SIMMS AND GRINDSTAFF, Rocky Mount, Va., has reopened mica mines in Henry County which have not been in operation for 25 years. Work has been started, according to G. B. Grindstaff, on property formerly owned and operated by the Ridgeway Mica Corp., a Pittsburgh firm which suspended operations in 1915. At that time ore yielding from \$26 to \$300 a ton was taken out, depending on the quality.

THE MINERAL PRODUCTS CO., Phoenix, Ariz., recently installed a pilot plant of 3-ton per hour capacity at the Muscovite mine. A dry process of treating mica products is used to make sizes ranging from 20 to 250 mesh. A product up to 500 mesh is made in a wet process test plant. C. L. Orem is manager.

ROCK PRODUCTS

C. P. Calcium Carbonate

An established article of commerce as a substitute
for lime and limestone in fine glass manufacture

AN ATTRACTIVE little booklet recently issued by the Diamond Alkali Co. (Pure Calcium Products Division) gives an example of the progress being made in the lime industry (using that term in its broad sense as covering all the products made by burning or processing limestone). Limestone or lime has been used in glass manufacture for many, many years and glass manufacturers have known more or less about its shortcomings for a long time. It remained, however, for the supplier of the raw material to make a better product. The Diamond Alkali Co. says its product is better and tells why. What follows is taken from the booklet referred to.

Lime in Glass

Lime is one of the "big three" substances that make up most of the commercial glasses. The others are silica, the foundation material for conferring glassy character, and soda, the flux that enables us to melt silica at a reasonable heat. A soda-silica glass has no durability. It can be dissolved in water to produce silicate of soda, or water glass. The addition of lime to the mixture to be melted makes a glass that is permanently resistant to the attack of water, and is a durable commercial product.

When lime is being discussed in connection with American glass-making, it becomes necessary to put the word in quotation marks and to do a little explaining. "Lime" means either calcium oxide, or a mixture of calcium and magnesium oxides. This is true because most of the limestones which are the mineral sources of glassmakers' "lime" are not strictly calcite (calcium carbonate, CaCO_3), but may be dolomite (calcium-magnesium carbonate, $\text{CaCO}_3 \cdot \text{MgCO}_3$), or any intermediate mixture of the two.

Sources of Lime for Glass

Since "lime" has thus become a somewhat indefinite term, the word "calcia" for calcium oxide, CaO , is coming into use. "Magnesia," for magnesium oxide, MgO (cousin to CaO), is a common enough word. The expression "high-calcium lime" refers to a product in which calcia predominates; a "dolomitic lime" is one in which the calcia-magnesia ratio approaches that found in the mineral dolomite.

Leaving out of consideration the dolomitic limes, for the sake of simplicity, and because they are not comparable with the material that forms the principal subject of this discussion, we may glance briefly at the forms in which the glassmaker may buy his lime.

The natural rock is limestone, consisting of calcite—more rarely a different crystal form called aragonite—contaminated by silica, alumina, and iron oxide. The sand and clay which carry these oxides into the limestone are not easily removed, and they remain in the crushed and ground material as it enters the glass "batch." The extent of these impurities is variable from one quarry to another, and even from place to place in the same quarry. Limestone is inert in storage, and is therefore as uniform in composition as the variations in the quarry rock permit. . . .

It is easily understood how lime, in

Comparison with Other Raw Materials

We have only to examine the compositions of good glass sand and modern soda ash to see how bad the natural limes appear by comparison.

No. 1 glass sand contains more than 99.8 percent silica, with less than 0.15 percent alumina, and iron oxide often as low as 0.015 percent and rarely over 0.025. Traces of other impurities are negligible.

The soda ash of today is more nearly a "c.p." chemical than was the reagent sodium carbonate of our grandfather's time. A negligible trace of iron, a few tenths percent sodium chloride, and a very slight amount of moisture, will be found.

Other less important chemicals, such as borax, saltpeter, and carbonate of potash, are also ready for the glassmaker in virtually chemically pure condition.

It is in order to supply a source of

	Raw Limestone	Burnt Lime		Hydrated Lime
		Fresh	2 Wks. Old	Fresh
Lime CaO	55.33	97.75	89.80	74.48
Silica SiO_2	.38	.67	.61	.51
Alumina Al_2O_3	.17	.30	.32	.23
Iron Oxide Fe_2O_3	.10	.18	.16	.14
Loss on heating $\text{CO}_2, \text{H}_2\text{O}$	43.36	....	8.00	23.91
Other Impurities as CaSO_4	.66	1.10	1.11	.83
	100.00	100.00	100.00	100.00
Lb. Material per 1 Lb. CaO	1.81	1.02	1.11	1.34

its various forms, gains the bad reputation of being the most impure and variable of all glassmaking materials. Typical compositions of the three forms just described may be of interest.

Chemical Analyses

A brief study of the table above brings out three facts: (1) the iron impurity is ten times as great as in a good glass sand; (2) it is necessary to know the source and history of one of these materials, in order to determine how much to use; (3) a serious difference in composition may arise from taking lime from different parts of the same bin. Furthermore, it should be remarked that the presence of magnesia, substituting for calcia, has been entirely neglected in these compositions.

lime equally reliable that "Non-Fer-Al" is offered to the glassmaker.

Preparation of Non-Fer-Al

Starting with a water solution of a calcium compound, from which magnesia, alumina, and iron oxide have been thrown down by a chemical process, and all insoluble impurities have been settled out, the manufacturers of Non-Fer-Al apply a precipitant which forms exceedingly fine, pure crystals of calcium carbonate in the clear calcium solution. The snowy-white carbonate is separated out on a filter, washed by a pure water, dried, and prepared for shipment in paper bags. The final product is the nearest approach to chemically pure CaCO_3 that can be commercially produced.

The name of this product—Non-Fer-Al—is derived from the fact that

MIXING DATA			
Materials	Wt., grams	Vol., c.c.	Vol. of Mixt., c.c.
Sand	400	290	440
Soda Ash	160	150	
Non-Fer-Al	80	90	
Lb. per cu. ft., Calc.			
Sand .....	.86	Non-Fer-Al .....	.55
Soda Ash .....	.07	Mixed Batch .....	.90

it is practically free from ferric and aluminum oxides. It contains definitely 55.75 percent calcia, CaO. To supply one pound of CaO, 1.79 lb. of Non-Fer-Al is required, without variation.

The manufacturers of Non-Fer-Al maintain a research and control laboratory, in which each lot of the product is analyzed before it is packed for shipment. The buyer is thus assured of exact uniformity of composition. The chemical analysis given is conservatively stated, and represents maximum impurities permitted. Many shipments contain less than 0.005 percent iron oxide, and every bit of Non-Fer-Al produced is more nearly iron-free than the best glass sand.

Physical Character

This precipitated carbonate of lime is perfectly inert in all climates, and has no possible tendency toward change in weight, nor toward forming cakes or lumps. The particles are fine, yet free-flowing, so that an intimate mixture in the glass batch is easily made. Experiments show that when sand and dense soda ash are mixed, in the average glassmaking proportion, the resulting volume shows no contraction or shrinkage below that of the total volume of the two materials before mixing. If now the usual proportion of Non-Fer-Al is added, and the three materials are well mixed together, the entire volume of Non-Fer-Al disappears into the voids between the grains of sand and soda ash. This "packing" not only offers an economy of space in pot-filling, but it produces a mass of batch more easily penetrated by heat because of the relative absence of insulating voids or air-spaces.*

Non-Fer-Al is used in all varieties of lime glass, for making plate-and-window-glass, bottles, tableware, ornamental and illuminating ware, and optical glass. It is especially recommended wherever precise composition and good color or high transmission of light are desired.

* One manufacturer who watches production closely has stated that pots using Non-Fer-Al have consistently cleared up two hours sooner than pots using ordinary burned lime.

Crystal Glass

Glass which shows no perceptible color is known as "crystal." It is made by introducing small amounts of such colorants as manganese, selenium, and cobalt, whose effect is to mask the yellow-green tint caused by the

CHEMICAL ANALYSES OF NON-FER-AL

Calcium Carbonate	99.572
Silica .....	.005
Iron Oxide	*.007
Alumina .....	.056
Calcium Sulfate .....	.260
Magnesium Carbonate .....	.100
	100.00

* Non-Fer-Al Brand is guaranteed to contain not more than .010% of Iron Oxide as Fe_2O_3 .

inevitable presence of iron. Glass containing iron absorbs part of the light at both ends of the visible spectrum, transmitting best the medium wave-

COMPARATIVE AMOUNTS OF IRON IN GLASSES

Material	Weight	Percent Fe_2O_3	Weight Fe_2O_3
Sand	740	0.020	.148
Limestone	148	0.100	.148
Glass I	1000	0.030	.226
Sand	740	0.020	.148
Non-Fer-Al	148	0.007	.010
Glass II	1000	0.016	.158

lengths, and giving a green color sensation. Decolorizers must absorb part of these radiations, in order to produce a balanced or uniform absorption, and a corresponding absence of color. But this process obviously reduces the total transmission, and the more iron there is to be covered by decolorizers, the more darkening re-

sults, and the glass brilliance suffers.

Not more than a few hundredths percent of iron oxide in a glass can be successfully masked by decolorizing; and the more nearly the glass is iron-free, the more brilliant and sparkling the crystal can be made.

A comparison between the iron contents of two glasses, one made with ordinary limestone and one with Non-Fer-Al, will illustrate the point. The final glass is assumed to contain 74 percent silica and 8.2 percent lime, and the members of the batch that introduce negligible amounts of iron have been omitted.

The relative darkening of the glasses by the iron is shown schematically by the ruled squares below.

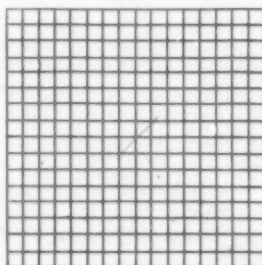
Optical Glass

The highest achievement of the glassmaking art is optical glass. In this, homogeneity and accuracy of compounding are paramount, and high transparency is scarcely less important. Makers of optical glass are users of Non-Fer-Al, because it enables them to duplicate in melt after melt the compositions that have shown the correct optical properties. Moreover, their product must have the very minimum of iron content, in order to obtain the best possible transmission, or transparency, throughout the visible spectrum.

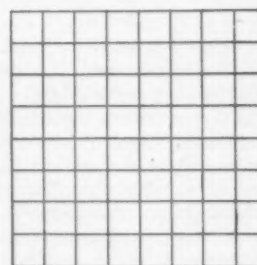
Optical glass is never decolorized,

because this would sacrifice a part of its essential quality. Its water-white color is secured by the use of the best sand obtainable, with Non-Fer-Al as the source of lime.

Delicate tints, such as the rose of selenium or the violet of neodymium, are at their best in glasses in which dull green of iron does not interfere.



Left: Glass I, in which ordinary limestone is used. Right: Glass II, in which an iron free CaCO_3 is used



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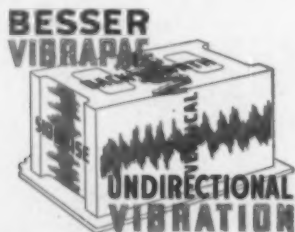
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	Besser Victory Automatic Vibrapac	8 Hr. Capacity 2160
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THE SAVING IN PALLET COST WILL PAY FOR A BESSER VIBRAPAC PLAIN PALLET STRIPPER



To the left: Bucket elevator carries aggregates to two steel bins holding two sizes of materials. To the right: Recently acquired ready mixed concrete truck with office in the background

Ready Mixed and Block

STARTING four years ago with two transit mixer trucks, the Ideal Concrete Products and Fuel Co., South Beloit, Ill., has gradually increased its business to the point where three modern Rex units are operated. Two of these units are 1½ cu. yd. capacity on Chevrolet chassis and the latest addition is a 2-cu. yd. unit mounted on a 2-ton Dodge chassis. The most recent expansion is the concrete products plant.

Owing to the fact that two nearby sand and gravel plants have convenient truck unloading bins and weigh batch equipment, no investment in batching facilities are required. The mixer trucks obtain cement as well

- A Good Business Combination

as aggregates from the sand and gravel plants. Water metering equipment also is available.

At the present time all the block made have sand and gravel aggregate, but a lightweight block will also be produced, using Waylite.

As shown in one of the illustrations, the sand and gravel aggregate is dumped by trucks into a hopper feeding the boot of a bucket elevator, about 30-ft. centers, which carries it to two tapered steel bins supported by heavy timber beams. Bin No. 1 holds 6 cu. yd. of pea

gravel, and Bin No. 2 holds 6 cu. yd. of sand. Each bin has a large steel box below the tapered end on which there is a hinged gate that permits this measured quantity of aggregate to drop into the 18 cu. ft. Stearns' mixer located on the floor level. After the concrete batch has been thoroughly mixed, it is discharged into a skip bucket that elevates the concrete to the hopper feeding the Stearns stripper block machine.

The mix comprises 15 cu. ft. of torpedo sand, 5 cu. ft. of pea gravel,

(Continued on page 81)



Left: Stripper block machine, showing mixer in the rear. Right: Mixer below with batch box and dumping gate under one of the aggregate bins

Spin Concrete Pipe At 40-Miles An Hour

High pressure water pipe made
with special equipment by spinning
concrete-filled forms at high speed

THREE PRIMARY METHODS are employed in the manufacture of concrete pipe: the spun process, vibration, and tamping. At the Hillside, Ill., plant of Lewistown Pipe Co., two of these methods are used to make high pressure water pipe. The main office and another similar plant are located at Fort Wayne, Ind.

Much of the equipment has been designed especially for this process and has been patented. The principal feature of this process is the method of forming the pipe by spinning the concrete within a steel cylinder form at a surface speed of 40 miles an hour. This gives a very dense concrete from which all excess water and laitance is removed by the

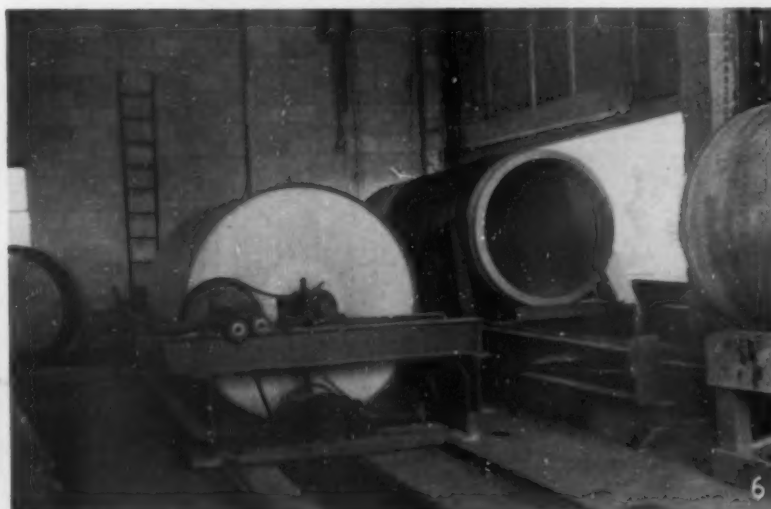
strong centrifugal force exerted by the spinning forms. In the accompanying illustrations are shown the various steps in the manufacture of the pipe.

Spinning Process

The first step in the manufacture of the pipe is the preparation of the steel cylinder forms. These forms have flanged ends which serve to hold the forms in place while they are being spun and also to facilitate their handling on rails to the spinning machine and into the steam curing rooms. Provision is made in the forms for the steel inserts which hold the ends of the steel wire reinforcing which is applied after the pipe come from the curing rooms, and also the longitudinal rod reinforcement placed under tension. All steel forms must be perfectly balanced in weight to prevent excessive vibration while they are being spun, and it is sometimes necessary to weld on metal lugs to give this balance. Before the forms are rolled up to the spinning machine, they are carefully inspected and a rosin liquid mixture is brushed

Steps in the manufacture of high pressure water pipe. Fig. 1: Mixer just outside plant entrance receives aggregates and cement in batch trucks. Fig. 2: Track on which pipe forms are rolled to spinning machine. Fig. 3: Spinning pipe at 40 m.p.h. Fig. 4: Automotive engine drives spinning machine through V-belt drive. Workman is smoothing interior of pipe with long-handled trowel. Fig. 5: Rolling out concrete pipe from steam curing room

Fig. 6: Application of high-tensile strength wire reinforcement to concrete pipe. To the left is the sand-filled drum, which provides the tension, geared to travel over rails and spaces wire uniformly on pipe. To the right is the pipe to which wire is applied. Rubber-tired wheels on shafts turn the pipe through a reduction gearing driven by automotive engine



on the inside which prevents concrete from adhering to the forms.

As the steel forms reach the end of the rails near the spinning machine, they are raised on to the spinning wheels by means of hooks on the end of chain hoists which engage the flanged ends. The chain hoists travel on I-beam rails supported from the ceiling joists and extending the length of the room. The processing room is open at this end with a 21-E-Koehring paving mixer located immediately outside.

Aggregates received in batch trucks from the nearby Bellwood plant of the Consumers Co. consists of limestone screenings from $\frac{3}{4}$ - to $\frac{1}{4}$ -in., and sand from $\frac{1}{4}$ -in. down. The mix is one part cement, one and one-half parts sand, and one and one-half parts of stone with water added to give about a 3-in. slump.

Rubber-tired batch buggies receive the concrete from the mixer and are placed within convenient reach of the men who shovel the concrete into the spinning forms. After sufficient concrete has been placed within the forms, the workmen use a long-handled trowel to finish the pipe while it is spinning. The spinning wheels on which the cylindrical forms revolve are driven by a Model A Ford engine through a V-belt drive. The length of time required to spin the forms is dependent on the size of the pipe being made. Usually two pipe are made simultaneously on the spinning machine.

After the pipe leave the spinning machine they are handled by the hoists into the curing rooms which are located at right angles to the processing room. The pipe are subjected to a three-day steam curing

period, the steel forms being removed at the end of the first day's curing while the pipe are still warm. A 50-hp. vertical boiler provides steam.

Applying Wire Under Tension

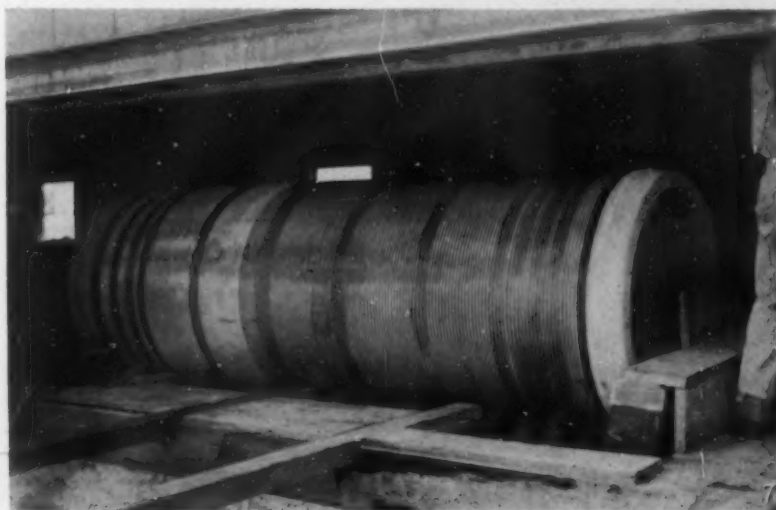
The next step in the process of making high pressure pipe is to wind the $\frac{3}{16}$ -in. high carbon steel wire under tension around the pipe. The illustrations show the special wire-winding equipment.

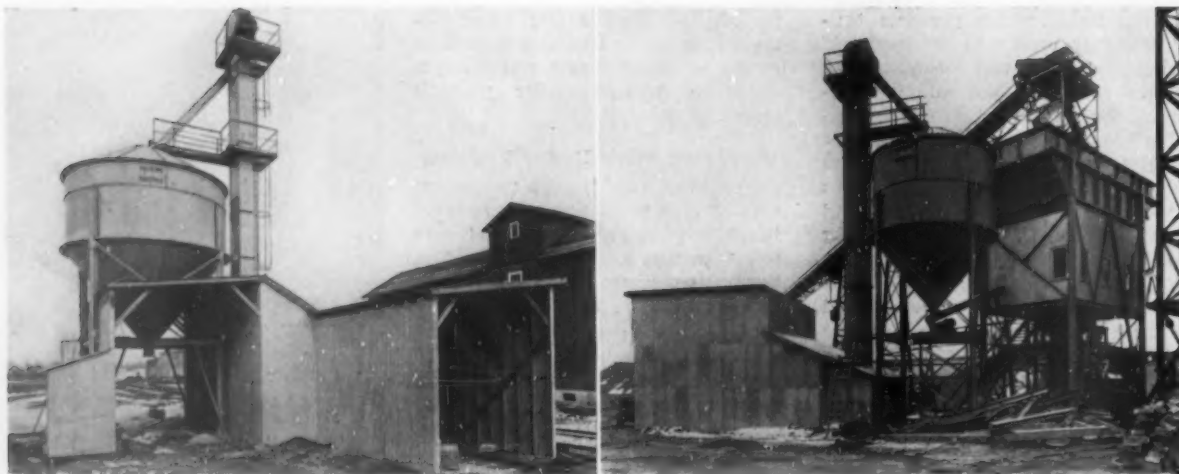
The concrete pipe is lowered by the hoists to rest on two parallel rows of rubber-tired wheels which are turned by shafts driven by a Ford V-8 engine through a D. O. James speed reducer. Tension on the wire is provided by the large drum which contains sufficient sand to give the necessary drag. Steel vanes are welded within the drum to increase the resistance. The steel wire passes from the reel through straightening rollers and thence over a large wheel fastened at the end of the drum to the concrete pipe to which it is fastened by a hole in a steel lug cast within the pipe. The drum moves on rails through a driving mechanism which spaces the wire accurately on the

(Continued on page 81)

Handling pipe in the yard. Fig. 8: Tractor-truck-semi-trailer unit for transporting pipe, and in background, a batch truck which has just delivered its load to the mixer. Fig. 9: Small mixer on platform supplies concrete mortar transported in rail-mounted batch car to wire-reinforced pipe in steel forms for final coating. Fig. 10: Crawler-mounted gantry crane to handle sewer pipe. Fig. 11: Crane with special yoke to handle pipe in the yard. Fig. 12: Wire-winding wheel at end of sand-filled drum

Fig. 7: Close-up of concrete pipe receiving steel wire reinforcing. Lines on pipe are made by the pressure tracks of the rubber-tired wheels





To the left, bulk cement unloading and storage plant. Cement bin has 1500-bbl. capacity. Cement elevator has 75 tons per hour capacity, and is equipped with screw unloader for hopper bottom cars. To the right, one of the central mixing plants having a cement bin with 1000 bbl. capacity fed from 50-ton vertical cement elevator, and an aggregate bin of 400 tons capacity. Weighing batchers for aggregates and cement are of individual type with beam scales and full automatic operation, arranged to feed three 1-cu. yd. mixers

Central Mixing For Tunnels

Concrete is hauled in special dump body trucks to tunnel shafts, chuted into 5 cu. yd. agitator bodies mounted on cars and hauled by Diesel locomotives to job

SUPPLYING CONCRETE for large public projects or defense industries introduces entirely new problems which require the most modern methods and equipment to do the job speedily and economically. The ready mixed concrete producer now engaged in this

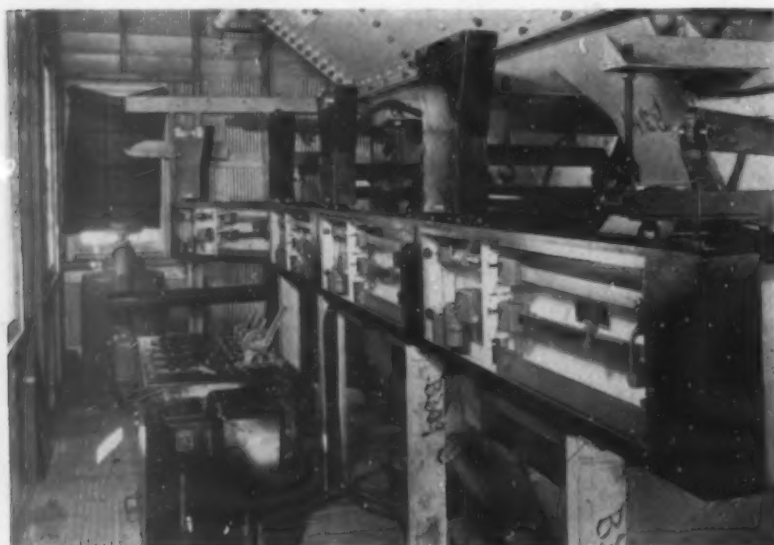
work or who plans to bid on contracts should, therefore, find much of interest in the bulk cement unloading and storage plant, central mixing plants, and equipment for handling concrete to the jobsite which were set up by Samuel R. Rosoff, Ltd., for

concreting a substantial portion of the Delaware Aqueduct tunnel.

This project involves the placing of 340,000 cu. yd. of concrete in the longest tunnel section, 14.2 miles, being built by a single contracting organization. The description supplements the article about the Rosoff sand and gravel plant which was published in *Rock Products*, March, 1941, p. 31.

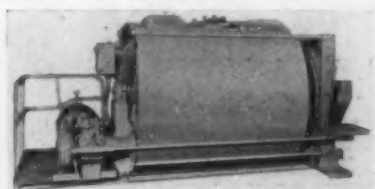
Reference to the map shows the location of the key points on the tunnel project. Concrete is mixed in central mixing plants at three points on the tunnel: namely, shafts No. 2, No. 2A, and No. 3. Two complete, identical central mixing plants of fully automatic type, designed and manufactured by Blaw-Knox Co., are provided. The first of these to go into operation is at shaft No. 3; the second plant has been installed at shaft 2A. Later, the plant at shaft No. 3 will be moved to shaft No. 2.

A bulk cement unloading and storage plant has been installed at Kerhonkson, N. Y., on the New York, Ontario and Western Railroad, from which point cement will be hauled to shaft No. 2A and shaft No. 2. The bulk cement will be hauled in dump



Automatic weighing batchers, scales, and central panel control board in central mixing plant

trucks fitted with metal covers in which are provided two loading hatches. From the cement storage plant at Kerhonkson to shaft No. 2A,



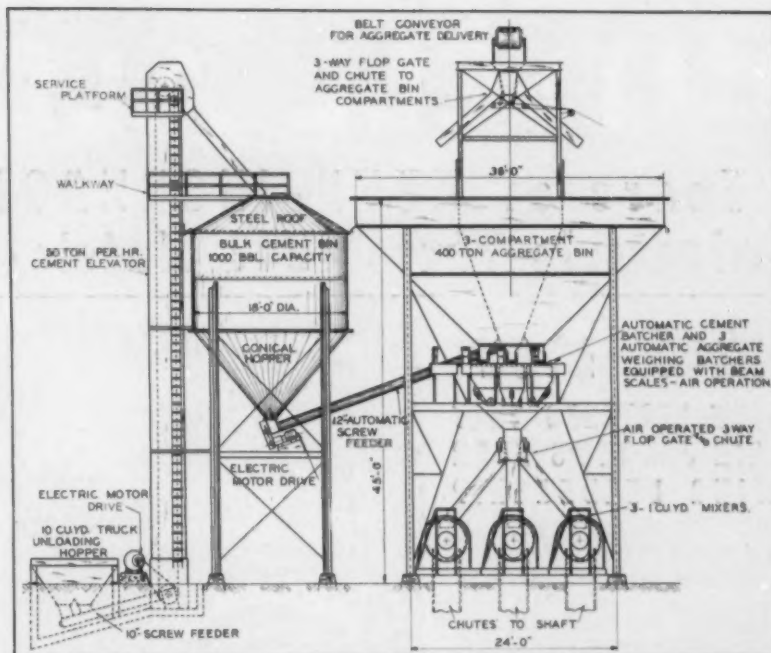
Twenty-two, 5-cu. yd. agitator bodies of this type are used to transport concrete in the tunnel. Each agitator has its own electric motor drive

the distance is about 4½ miles; from Kerhonkson to shaft No. 2 it is four miles. At Gardiner, N. Y., on the West Shore Railroad, is a second identical bulk cement unloading and storage plant. The distance from Gardiner to shaft No. 3 is five miles.

Cement Unloading and Storage

Sand and gravel will be hauled in dump trucks, six tons to the load, from the sand and gravel plant (see Rock Products, March, 1941, p. 31) near Wawarsing, N. Y. The distance from the sand and gravel plant to shaft No. 2A is approximately 8½ miles; to shaft No. 3 it is nearly 18 miles. Shaft No. 2 is only one-half mile north of the sand and gravel plant.

The two bulk cement unloading plants located at Gardiner and Kerhonkson each consist of the following equipment: A 75-ton vertical, en-



Elevation drawing of central mixing plant showing details of construction and arrangement of equipment

closed bucket elevator equipped with screw elevator is used to unload cement from hopper bottom cars. The conveyor and screw unloader are electric motor operated. The storage bin, with a capacity of 1500 bbl. of cement, includes a complete steel roof, and the bin hopper is of the conical type. A valve and chute for loading cement into trucks is part of the bin equipment. Trucks carry from 60 to 70 bbl.

of cement per load. These cement unloading and storage plants are similar to plants furnished by Blaw-Knox Co. to other contractors on this project.

Mixing Plants

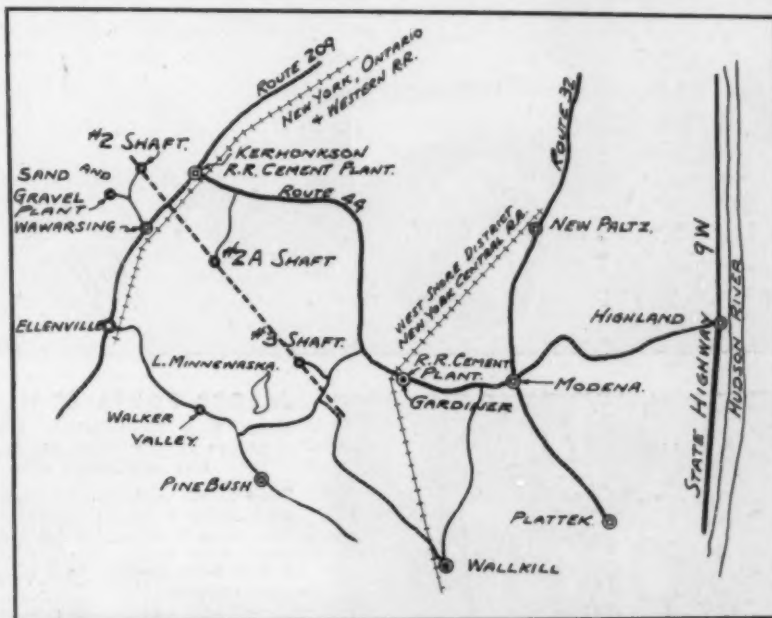
Two identical mixing plants were specially designed for this project by the Blaw-Knox Co. Each mixing plant is fully automatic in operation, and has a capacity of 130 1-cu. yd. batches per hour. Each plant includes three 1-cu. yd. Ransome mixers. The weighing of the materials for the concrete, the discharge from the weighing batchers into the mixers, the mixing cycle, and the discharge from the mixers is all set up on an automatic cycle.

The aggregate bin, of 400 ton capacity, is divided into three equal compartments. Aggregates are fed into the top of these bins from Barber-Greene inclined belt conveyors.

Each central mixing plant includes a 1000-bbl. bulk cement storage bin which is filled by means of a 50-ton vertical, enclosed type bucket elevator equipped with a 10-cu. yd. truck unloading hopper. Link-Belt Co. furnished the elevators to Blaw-Knox design.

There are three weighing batchers for the three classes of aggregates, and each is fully automatic with air-operated filling and discharge gates. The cement weighing batcher is fed

(Continued on page 80)



Map showing location of central mixing plants with relation to tunnel shafts of Delaware Aqueduct tunnel project

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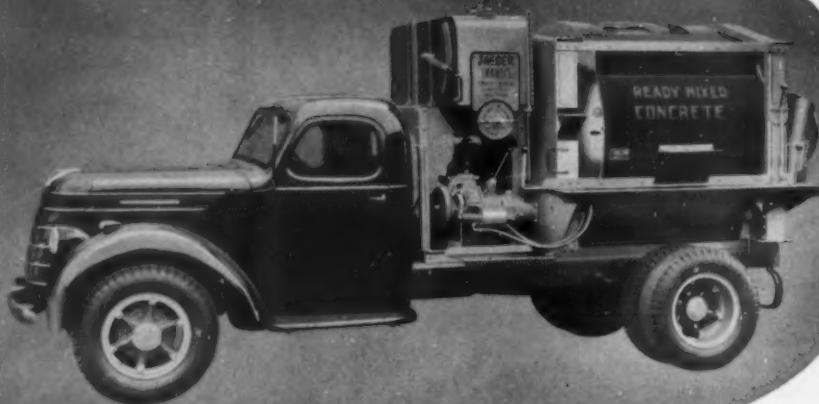
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- 1 "SURE-SEAL" models to meet rigid specifications, with
- 2 AIR-TIGHT VACUUM-CONTROLLED DISCHARGE DOOR
- 3 "DUAL-LOADERS" equipped for both top and end loading to meet different conditions, with
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Offered in 6 improved models—lowest to load (thus saving on bin equipment), fastest to mix and discharge any slump concrete, and equipped with larger "Dual-Mix" drums which take the payload capacity of modern trucks. In addition, many exclusive Jaeger operating features shorten the payload trip, increase the number of daily payloads, achieve maximum daily production of higher strength concrete.

Buy wisely—see "Check List" at left—it shows why these units are the overwhelming choice of operators who do steady, big volume business.

HIGH DUMP TRUCK MIXERS, AGITATORS

2 to 5 Yd. Sizes, Offered in Two Types to Meet Every Condition

- (A) "SURE-SEAL" MODELS with Top-Loading and Inspection Door and Vacuum-Controlled Discharge Door, Giving Air-Tight Drum.
- (B) "DUAL-LOADING" MODELS Equipped with Both End Loading Hopper and Top-Loading and Inspection Door.

Only Jaeger offers you truck mixers that combine high discharge with the ability to meet every specification and demand. Have all the proven features that have made Jaeger the acknowledged leader—bigger sizes of Dual-Mix Drums with Throw-Back Reversing Blades insuring higher strength concrete—fastest of their type to mix and discharge low slump material—Two-Speeds for long or short hauls or agitation—Shock-Proof Transmission with Vacuum Cab-Controlled Truck Engine Drive or Separate Engine—"Winter-Safety" Water Booster and Dual Revolving Sprays—Compactness to mount on Ford-type trucks.

Buy wisely—see "Check List"—it shows why Jaeger HIGH DUMP is outselling all other high discharge types.



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Discharging
Hopper Attach-
ment Permits
Top or End
Loading in
Order to
Meet Conditions . . .



Only end-loader that does not constrict drum opening and slow up charging and discharge. One quick turn of hand wheel opens or closes Discharge Gate—no need to move entire Hopper (requiring many turns of a wheel)—no second seal to leak or wear.

Furthermore, where specified, these "Dual Loaders" may be top-loaded like any other Jaeger. This combination of top or end loading to meet conditions is patented and exclusive.

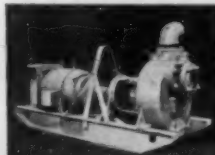


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RS AND AGITATORS THAN BY ANY OTHER METHOD

Central Mixing For Tunnels

(Continued from page 77)

from a 12-in. diameter automatic screw feeder which connects the outlet of the cement bin with the cement weighing batcher. The cement is discharged through an air operated valve.

All scales are beam scales, and all conveyors and screw feeders are electric motor operated. The aggregate and cement weighing batchers discharge into a confining hopper, at the bottom of which a three-way flop gate diverts the respective batches to three chutes leading to the three 1-cu. yd. mixers. The three-way flop gate is also air operated. Water is measured by volume in the tanks supplied with the concrete mixers.

Batchmeter Systems

Batchmeter systems, for controlling the mixing time, are interlocked between the batching equipment and the mixers. The illustration of the operator's control panel shows the various controls for all functions of the automatic central mixing plant.

One of the illustrations shows separate discharge chutes for each of the three 1-cu. yd. mixers. These chutes converge into a 12-in. diameter pipe

which conveys concrete to the bottom of the shaft. The depths of shafts are as follows: No. 2, 850 ft.; No. 2A, 1600 ft.; No. 3, 840 ft. At the bottom of the 12-in. pipe a hopper of 6-cu. yd. capacity and control gate are provided. Here the concrete is loaded into a fleet of 22 Blaw-Knox 5-cu. yd. agitator bodies. Each agitator has its own electric motor for operation, and four units make up a train, the hauling being done by Diesel locomotives. A similar use of mixer equipment on flat cars above ground was described in *Rock Products*, January, 1941, p. 52.

Officers of the Samuel R. Rosoff organization are as follows: Samuel R. Rosoff, president; Arthur H. Diamant, vice-president; Fred Stiefel, chief engineer; James Fisher, superintendent; Dave Stinson, master mechanic; Phillip Miller, construction engineer, and John Holden, superintendent, Material Plant. Board of Water Supply engineers directly concerned with this job include: Max F. Freund, division engineer in charge; Neil Holdredge, department engineer on northern aqueduct; Chas. Clark, chief engineer, Board of Water Supply; Roger Armstrong, deputy chief engineer; Harry Bouton, designing engineer.

Pre-Mix Sells Block Business

CENTRAL PRE-MIX CONCRETE CO., Spokane, Wash., has purchased the Frese Sand, Gravel and Ready-Mixed Concrete Co., and has sold to J. Frese its concrete block plant and business. Mr. Frese, owner of the Spokane Loc-Block Co., plans to combine the two block plants and devote his entire time to that phase of the concrete business. Herb. Sullivan, manager of Central Pre-Mix, says the transaction adds four more trucks to the transit mixing fleet, and with the purchase of a new unit the total will be 14. About half the fleet is engaged in supplying concrete for the new Sunset airport.

To Make Brick

THE LINTZ BUILDING AND SUPPLY CO., Fort Branch, Ind., has installed a new machine for the manufacture of concrete brick. This company has been making concrete block for some time.

Fire at Block Plant

CRUMB-COLTON Co., Rockford, Ill., recently suffered a considerable fire loss in its concrete block plant. Two concrete block machines were damaged.



Without the grief caused by other kinds.
No more broken, warped or cracked pallets.
No more grinding and filing to fit.
Commercial Pallets are made cold under pressure; insuring close core box fit.
Ribs are formed along edges and crosswise to prevent bending. This increases strength.
Also forms mortar grooves.
Why experiment with any other type?

Write for Catalog.

The **COMMERCIAL SHEARING &
STAMPING COMPANY**
Y O U N G S T O W N , O H I O .

LOW INITIAL COST LOW MAINTENANCE COST



ONE OF
OUR MANY
DESIGNS

Chase "all steel" Block racks are built to suit your individual requirements. Our experience and engineering will give you a rack with the proper dimensions and arrangement for loading your product and the proper under clearance to work with your lift truck.

WRITE
for Catalog and
Special Low Prices

Complete line of concrete block cars, decks, Lift Truck Racks, transfer cars, turntables, dump cars, etc.

CHASE DRYER CARS &
TRANSFER CARS
CHASE FOUNDRY & MFG. CO. COLUMBUS, OHIO

Spin Concrete Pipe

(Continued from page 75)

concrete pipe. Wire tension is about 60 percent of the elastic limit of the steel.

After the wire is applied the pipe is rolled out to the yard and placed in another steel form for the application of a finishing coat of cement mortar to a depth of 1-in. over the wire reinforcing. Steel collars at the ends of the pipe accurately position the pipe within the form. A model 206 P. & H. crane fitted with a special steel lifting yoke raises pipe forms into vertical position along a wooden frame platform on which a 10-S Concrete Mixer Corp. mixer is located at one end. Concrete batches are elevated to the mixer by skip bucket. Traveling on a track over the raised platform is an interesting concrete distributor car which may be moved from pipe to pipe. The concrete mortar consists of one part cement and three parts sand which is vibrated into place within the forms by Syntron vibrators.

Following the placing of the exterior concrete mortar coat, the pipe are steam cured under canvas one day within the form and a second day after they have been removed from the form. High pressure water pipe are made in sizes ranging from 12-in. to 72-in. diameter.

To the right of the smaller Concrete Mixer Corp. mixer, used for making the concrete mortar finish coat on high pressure pipe, is a 27-E Foote mixer on a lower platform which provides concrete for the manufacture of sewer pipe. Sewer pipe are cast in steel forms with the concrete vibrated into place by vibrators applied to the steel forms.

In one of the illustrations may be seen one of the two new International tractor units pulling Freuhauf semi-trailers which are used in hauling finished pipe and for yard work.

Officers of the company include: J. E. Miller, president; H. K. Cain, sales manager, and Paul Osweller, plant manager.

Ready Mix and Block

(Continued from page 73)

and two sacks of cement. Average yield is about 20 block to a sack of cement which is considered conservative. Two men are used regularly in making block, the operator and the mixer man who also serves as off-bearer. About 800 block are made in 5 hr.

W. C. Kepplinger, president of the company, who has been aggressively selling concrete masonry units and ready mixed concrete, believes that

increasing business may be attributed to efforts in providing quality products.

Double Capacity

GAGER LIME MANUFACTURING CO., Sherwood, Tenn., is installing additional agricultural limestone equipment to more than double its present capacity. The new unit consists of a 30-in. Jeffrey hammer mill, closed-circuited through a Link-Belt bucket elevator with a Tyler Hummer vibrating screen. Bin capacity will be 125 tons and the feed material will be minus 1½ in.

Fire Destroys Block Factory

ACKER CEMENT PRODUCTS & SUPPLY Co., Fort Wayne, Ind., suffered a fire loss early in April which may reach \$20,000, according to Elmer Smith, manager. In addition to concrete block, this company makes a number of concrete specialties.

County Closes Block Plant

ANNOUNCEMENT has been made that the County block plant on West Boulevard, Pontiac, Mich., would go out of business. The equipment will be stored for possible future use. Herman J. Rauchley, in charge of the plant, said that it is planned to manufacture only what may be needed for the addition to the county's office building now being built. The plant originally was provided to give employment to prison labor.

New Firm

CLAUDE MONCE and FLOYD J. BROOKMYER are reported to have started up a concrete brick and block factory at Linn Grove, Ind., near the Meshberger Stone Co. quarry. Both owners of the block company are associated with the crushed stone company, and the plant will be located in one of the quarry buildings.

Start Making Pipe

THE UNDERGROUND PIPE CORP., Decatur, Ill., has started up its concrete pipe plant for the manufacture of 12-in. tile to fill an order from Burlington, Iowa. Mr. Chastain is president, and Melvin Tuetken is plant superintendent.

Correction

ON PAGE 61 of the April issue of ROCK PRODUCTS in the article entitled, "Completely Automatic Block Plant," the caption under one of the cuts should have read, "Fully automatic vibrating block machine producing 5000 8- x 8- x 16-in. units daily." It was incorrectly given as 500.

DURABILITY

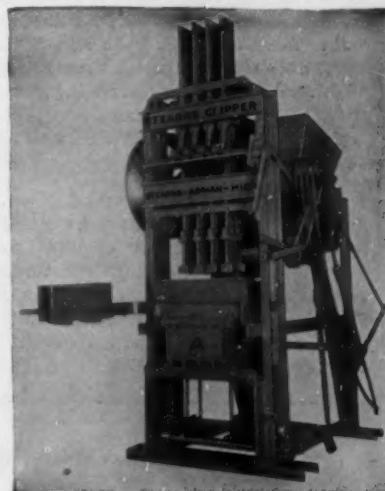


ECONOMY

Crescent Pipe Molds

for making concrete pipe are leaders in their line. Strongly constructed of steel sheets well reinforced for long service. Quick closing and opening saves time and labor. Ask for particulars.

**FLINT & WALLING
MFG. CO., INC.**
KENDALLVILLE, IND.



"ANCHOR"

Complete equipment for making concrete, clinker and other light weight aggregate units, including engineering service for plants and revamping of old ones for more economical service. Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns Joltcrete, Stearns mixers, pallets, Straublox Oscillating attachments, etc.

Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

Anchor Concrete Mch. Co.
G. M. Friel, Mgr. Columbus, O.



Left: Table vibrator to vibrate concrete in roof slab forms. Right: Roof slab on end and two types of block manufactured

Vibrator for Roof Slabs

NUCARTH BRICK & STONE CO., Carthage, Mo., has been manufacturing a light-weight cinder concrete roof slab which is meeting with popular favor of contractors and architects. This unit is shown in the illustration along with a slump block made with a crushed stone aggregate and a cinder block.

The roof unit is flat channel-shaped with a recess cast at the four ends of the legs to receive the steel roofing purlins which support the concrete slabs. They are 2 ft. wide and 6 ft. long, and are reinforced with a No. 10 gauge wire mesh having 6-in. openings, and two $\frac{1}{4}$ -in., and two $\frac{3}{8}$ -in. rods. Each finished roof slab weighs 140 lb.

A cinder aggregate, graded $\frac{1}{4}$ -in. down to dust, is batched with cement in a 3 to 1 ratio and water added to make a fairly plastic mix. Concrete is poured in wooden molds which are placed on a home-made vibrator table for a period of less than a minute. After vibration, the molds are re-

moved to a table where they are kept in a damp atmosphere until the slabs are strong enough for the removal of the forms. The roof slabs are then spray-cured for several days.

The table vibrator is of particular interest. It is constructed of heavy timbers reinforced at the corners with gusset members. At each corner of the top of the base frame is a stiff coil spring on which the vibrator frame is supported. Suspended from a bracket on the vibrating frame is an old automobile generator, having all wires burned off and 4 lb. of metal brazed on one side of the armature to impart off-balance vibrating impulses. The generator-vibrator is belt driven from a 3-hp. motor bolted to cross-members on the base frame of the vibrating table.

A. J. Graul is general manager of the company and James Hurst is foreman in direct charge of the plant.

Start Block Concern

SCIOTO BUILDING UNIT Co., Portsmouth, Ohio, is a new concrete products concern headed by R. F. John-

son, contractor. The plant will have a capacity of 2160 standard block per 8-hr. day. Cinder and sand and gravel concrete units will be made. Ora Carver is in charge of the plant.

New Block Plants

BORIN LUMBER & FUEL CO., Detroit, Mich., has added a cement block plant to its facilities, according to Sam Borin, president.

PERMA STONE Co. is planning to build a new concrete block factory in Youngstown, Ohio, which will cost with equipment about \$40,000. The firm started at Youngstown in 1928, and several years ago established a branch in Columbus, Ohio. President E. J. Miller reports that the first building for offices and storage will be a one-story structure 90- x 96-ft.

R. W. OHLFS, Ladysmith, Wis., is reported to have installed an automatic tamping block machine in a plant on West Worden avenue.

SURE CONCRETE BRICK CAN BE MADE WITHOUT PALLETS ON THE

JACKSON CONCRETE BRICK MACHINE

Just Think What This Means in Dollars and cents saved in handling and upkeep as well as the cost of the pallets themselves.

Investigate today the most efficient and up to date concrete brick making equipment on the market.

JACKSON & CHURCH CO.
SAGINAW, MICH.

CONCRETE PRODUCTS Consultation Service

In these pages, month after month, is published the most helpful information obtainable about the manufacture and sale of all kinds of concrete products. If you need further details about any of this material or about concrete products equipment our staff of engineer-editors will be glad to serve you. Producers everywhere are taking advantage of this extra service. Write us about your problems.

ROCK PRODUCTS

309 West Jackson Blvd.

Chicago, Ill.

Design New Type of House

Official of cement company builds concrete masonry house which is circular in shape

THE CEMENT STORAGE SILOS of the Louisville, Neb. plant of Ash Grove Lime and Portland Cement Co., were David F. Ziers' inspiration for the design of his new concrete home in



Close-up of concrete house showing the pleasing modernistic lines of the doorway and windows

Louisville. With this as the basic idea and a few additions in the design his home exemplifies the beauty in simplicity.

Mr. Ziers is chief electrician at the Louisville, Neb., plant and in building his home used concrete products wherever possible. Standard 8- x 8- x 16-in. block were furnished by the Ideal Cement Stone Co., Omaha, Neb., from its stock for the walls. The Ideal Cement Stone Co. also furnished the precast concrete joists.

The house sprung from a 2-in. pipe driven into the ground to form an exact center. A 16-ft. pointer was attached to the pipe and revolved as the house was built to assure roundness. As the building rose the pipe was lengthened, and it now serves as a conduit for electric wires.



Pouring the concrete roof over concrete joists

Mr. Ziers estimates that a similar house could be built for \$4000. This includes four rooms and a bath in the upper or main floor and a garage and recreation and utility rooms in



Exterior view of concrete house having concrete masonry walls and precast concrete joists

the lower floor. It also includes complete interior finishing and other structural features, such as insulated roof, two offset sections to break the perfect circle of the exterior and steel casement windows.

Japanese Cement Combine Conserves Resources

ALL JAPANESE cement companies will combine their production under a newly formed Japan Portland Cement Producers Association. This merger of interests is in line with other mergers in industry which are designed to conserve resources and distribute marketing outlets.

Concrete Hangars for Army and Navy

CONCRETE is coming into increasing use for army and navy aviation structures. Contracts have been let for reinforced concrete hangars for the U. S. Army at Borinquen, Puerto Rico, and for the Navy at San Diego, Calif.

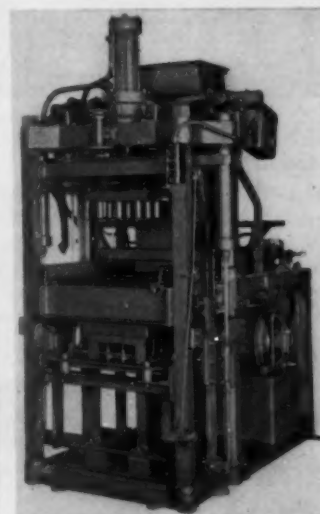
To Open Marl Deposit

WABASH PORTLAND CEMENT Co., Detroit, Mich., has taken over a marl deposit at Grass Lake near its Stroh, Ind., plant. A conveyor system is to be installed, probably underground, to deliver marl to the plant.

Buy Block Concern

GREENVILLE CEMENT PRODUCTS Co., Greenville, Penn., has been purchased by the Greenville Coal and Ice Co. The new owners plan to start operation immediately making building block, flue block, burial vaults and other products.

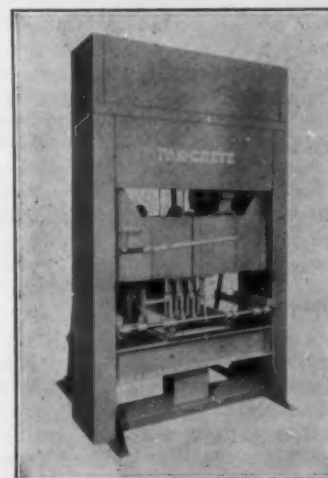
HYDRAULIC VIBRA-PRESS



A High Production Machine Making Blocks which are Demanded by the Contractor Endorsed by the Architect Desired by the Mason

The KENT MACHINE CO.
CUYAHOGA FALLS, OHIO

A LOT OF MACHINE FOR A LITTLE MONEY



VIBRATION AND PACKING

with

PAK-CRETE

BETTER BLOCKS AT LESS COST
PRECISION MADE—QUICK DELIVERY

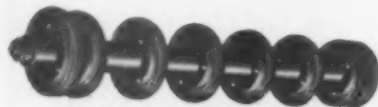
KRAMER CORPORATION
LEHMANN BLDG. . . PEORIA, ILL.

NEW MACHINERY ★

★ NEW EQUIPMENT

Rubber-tread Return Idlers

LINK BELT CO., Indianapolis, Ind., has developed a new line of rubber-tread idlers for supporting the return run of 14 to 60-in. wide belt conveyors. Each complete idler consists of from four to twelve 6-in.



Return idler has a split rubber tread to facilitate replacement

diameter rubber-tired rolls suitably spaced and mounted on a roller-bearing-equipped steel tube that will fit into the same supporting hangers as the regular Link-Belt return idler roll.

Individual rolls consist of a renewable extruded rubber tire clamped between two steel discs firmly held together by three round-head bolts. As the rubber tire is made split, it can readily be replaced with a new tire when required by removing three nuts.

The new idlers are recommended by the manufacturer for conveyors handling corrosive, abrasive, wet, or sticky materials, such as coke, phosphate rock, wet coal, etc. A rubber-to-rubber contact between the return idler and the underside of the conveyor belt and the kneading action of the rubber treads keeps the material from building up.

Electrically Controlled Feeder-Weigher

SCHAFER POIDOMETER CO., Pittsburgh, has announced that its Poidometer is now equipped with a motor-operated regulating gate, a patented feature which is recommended for material such as stone and clinker that contains cubes of various sizes.

The weighing roller, located in the center of the scale platform, is connected by means of the weighing beam and control rod to a control box. Limit switches in the control box are electrically connected to a reversing switch of the motor, which is coupled to a worm gear unit. The output shaft of the worm gear unit is

connected to a regulating screw which operates through a regulating rod. The safety limit switches are placed at the extreme upper and lower limits of the regulating gate travel.

Drop weights are placed in position and the slide weight is moved to the proper setting on the scale beam to give the desired amount of material per foot of belt. The Poidometer is then put in operation by pressing a push button. If the weight of the material on the scale platform is greater than the weight on the scale beam, the weighing roller is depressed and the control rod makes



Feeder-weighing device equipped with motor-operated regulating gate

contact with the limit switch which immediately starts the motor that lowers the regulating gate. This gate continues to lower until the weight of the material on the scale platform balances the weight on the scale beam.

When the weight of the material on the scale platform is lighter than on the scale beam, the weighing roller is elevated, making contact with the limit switch, reversing the motor which raises the regulating gate until the proper balance is reached.

If for some reason this balance is not reached in a reasonable time, the movement of the regulating gate in either direction is stopped when the regulating rod and nut contacts either the upper or lower safety limit switches, which also stops the poidometer motor. To start the poidometer in motion again, it is necessary to press the by-pass button. If the operator pushes the wrong button, which would cause an upward movement of the gate when a lower movement is desired, the regulating gate motor will not start. Contact with either of the safety limit switches will light the signal light.

More Powerful Tractor Shovel

THE TRACKSON CO., Milwaukee, Wis., has introduced its Model T7 which may be equipped with either a 2 or 2½-cu. yd. bucket. Mounted on the Caterpillar D7 tractor, the T7 Traxcavator can exert a 23,000-lb. push to the bucket to penetrate and dig the toughest soils, clay, caliche, or shale. The tractor is equipped with extended track frames and is specially fitted to give stability and traction to handle a 2½-cu. yd. bucket. It travels around the job at speeds up to six miles per hour, turns in its own tracks, and has a fast loading cycle for a machine of its size.



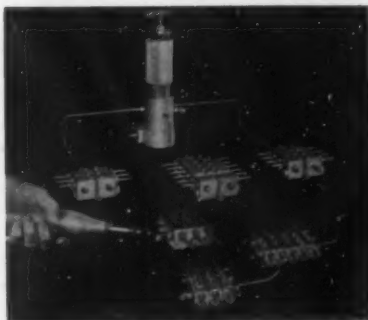
Tractor shovel equipped with 2½-cu. yd. bucket

Centralized Lubrication

TRABON ENGINEERING CORP., Cleveland, Ohio, has developed a non-reversing, single pipe system which provides forced feed centralized lubrication. This unit has a single inlet, multi-outlet distributor feeder and the series "MP" variable feed multi-outlet pump.

This improved feeder consists of a bank of three or more sections, each of which discharges a known and measured quantity of lubricant alternately through one or two discharge outlets which are direct connected to bearings. The capacity or volume of the different sections of the same distributor may vary from .005 cu. in. to .035 cu. in.

Consequently by selecting the proper number and capacity of sections and supplying the proper amount of lubricant to the inlet, it is claimed a single distributor discharging progressively through one outlet after another, delivers just the desired amount of lubricant to all the connected bearings even though the individual bearings have widely varying lubricating requirements. The



Showing non-reversing, single-pipe system which provides forced feed centralized lubrication

distributors can use either oil or grease. Each distributor must discharge lubricant from each and every outlet or the operator receives immediate warning.

Vibrating Conveyor

STANDARD TRANSMISSION EQUIPMENT Co., Los Angeles, Calif., has brought out a vibrating conveyor and feeder which is called the Free-Flow. This equipment operates on the lift-throw principle with the motion of the trough becoming increasingly horizontal with the progress of each cycle, thus imparting a forward motion to the conveyed material. It is said that the motion actually suspends the mass in the air with only momentary contact with the trough on the upward period, minimizing wear from abrasion.



Lift-throw, vibrating type of conveyor minimizes abrasion

The trough of the conveyor is self-cleaning. Oscillating arms, which actuate the trough, are mounted in special rubber bushings, which store the forward and return forces, thereby reducing power consumption to a minimum. By means of variable speed control of the rate of oscillation of the trough, volume can be controlled as desired, and the material can be conveyed up inclines to 15 deg. The trough can be of any desired material, open or enclosed for the handling of hot gaseous or dusty materials.

Making Synthetic Rubber For Defense Needs

GOODYEAR TIRE & RUBBER CO., Akron, Ohio, has announced increased facilities for the manufacture of Chemigum, a synthetic rubber. For the past three years the company has been developing and producing its own type of chemical rubber in its laboratories and in a small pilot plant in anticipation of national defense needs. The new plant will have an initial capacity of 10,000 lb. per day.

Chemigum is derived from petroleum, through a cracking process, and is the culmination of extensive work by Dr. R. P. Dinsmore, in charge of all development and research, and Dr. L. B. Sebrell, manager of chemical research. Tires of the newly announced chemical rubber are said to give superior performance to those made of German Buna and equal to those made of natural rubber.

Advantages claimed for Chemigum include: increased tensile strength, and resistance to aging, abrasion and oils. It is being used in the manufacture of gasoline hose, airplane brakes, gaskets, and sealing rings.

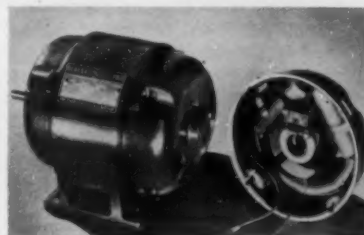
Drill Bit for Hard Rock

THE TIMKEN ROLLER BEARING Co., Canton, Ohio, has placed a new M series rock bit on the market. This bit is designed for drilling unusually hard rock formations with heavy drilling equipment. Although it is a heavy duty bit, it is intermediate between the H series, which is normally used with light and medium weight rock drills, and the heavy-duty D bit series, normally used on wagon and tripod

drills. As yet, the new M series is available only in a limited range of sizes.

Two Starting Torque Types of Capacitor Motor

GENERAL ELECTRIC Co., Schenectady, N. Y., is offering a new Tri-Clad capacitor motor designed to meet a large number of varied industrial ap-



Capacitor motor of new design, with end shield to the right, showing location of capacitors and transfer switch

plications. Like the polyphase motor of this type, the capacitor motor features modern appearance, and better mechanical and electrical protection as well as protection against operating wear and tear.

The new capacitor motor may be obtained with either ball-bearing or sleeve-bearing construction, and is available in two types, type KC and type KCJ. The type KC is designed particularly for applications requiring moderate starting torques such as fans, blowers, and centrifugal pumps. The type KCJ is designed for compressors, loaded conveyors, reciprocating pumps, and any other applications requiring high starting torque. The capacitors are mounted inside the end shield on the normal-torque motor, while on the high-starting torque motor, 1½-hp. and larger, the capacitors are mounted in a compact case on top of the motor frame.

In both of its forms, the capacitor motor incorporates the following protective features: mechanical protection through the use of a cast-iron frame, electric protection made possible by the use of Formex wire in the magnet coils, and improved bearing design and lubricating arrangements. It also utilizes the cast-aluminum rotor and double-end ventilation.

NATIONAL ASSOCIATION ACTIVITIES

Exemption of Seamen

AT A RECENT CONFERENCE in Louisville, Ky., of sand and gravel producers using the navigable waters of the United States, it was agreed that the industry would continue to proceed on what it believes to be the valid assumption that the so-called Smoot exemption applies wherever operating conditions are substantially similar; that is, employees on dredges located in navigable waters, which dredges are served by tugs and barges which transport the materials from the point of production to the point of distribution or further processing, are considered to be exempted as seamen within the meaning of the law.

Ready Mixed Concrete

EXECUTIVE SECRETARY V. P. Ahearn has sent a letter to the National Ready Mixed Concrete Association members, commenting on the serious situation which has arisen from the decision by Federal Judge Philip L. Sullivan in which he sustained the demurrers against indictments returned by the federal grand jury against Michael Carrozzo, the late "labor boss" of Chicago. These indictments alleged an illegal conspiracy, under the criminal provisions of the Sherman Anti-trust Act, to restrain interstate commerce in the sale of ready mixed concrete equipment in the Chicago area.

It is pointed out in the letter that Judge Sullivan's decision seemed to indicate a misunderstanding of the controversy. The purpose of the ready mixed concrete industry is not that of displacing human labor. The industry was organized in response to a demand for improving the quality of concrete and for the performance of a service for the contractor more efficiently and therefore more economically than he could perform it for himself with his own personnel and with his own equipment. Secretary Ahearn said that it was unfortunate that Judge Sullivan dealt so extensively with the question of whether a union is permitted, under the appropriate statutes, to protect the job status of its members, when other and perhaps more important considerations were involved.

"The Engineers' Union," he said, "was not addressing itself in Chicago to the matter of reduction in

total labor costs, but to the position that our industry, if permitted in Chicago, would cause a shift in employment from one craft to another. On this one question it rested its boycott of the industry."

Secretary Ahearn calls attention to Judge Sullivan's acceptance as a statement of fact the allegation that the whole problem grew out of a jurisdictional dispute between the Engineers and the Teamsters whereas the Engineers never had or asserted jurisdiction over truck mixers. They did at one time claim the right to demand that a member of their union be on each job solely to discharge loads from ready mixed concrete trucks, but John A. Lapp, referee of the Building and Construction Trades Department, A. F. of L., ruled that the Teamsters had sole jurisdiction.

As the Supreme Court of the United States in *United States v. Hutcheson* recently held that the strike of one union against another over a point of jurisdiction was exempted from the anti-trust laws by the policy of Congress when it enacted the Norris-LaGuardia Act even though the strike restrained interstate commerce, there seems to be little possibility of relief from the courts.

COMING CONVENTIONS

National Concrete Burial Vault Association, Stevens Hotel, Chicago, May 13, 14 and 15.

National Lime Association, The Homestead, Hot Springs, Va., May 28 and 29.

National Industrial Sand Association, The Homestead, Hot Springs, Va., June 19 and 20.

American Society for Testing Materials, Palmer House, Chicago, June 23 to 27.

National Cinder Concrete Products Association, Atlantic City, N. J., August 4, 5, and 6.

Slag

NATIONAL SLAG ASSOCIATION, Washington, D. C., has issued a 12-page booklet on itself, which could be read with profit by all who are interested in industrial association work and membership; for here is an association of 16 member companies (one of these in Australia), with a very limited budget, yet able to render its members real tangible services for the past 23 years. In addition to engaging in research on its own account, the association renders another service toward the promotion of slag, which many associations overlook, or are inclined to do in a less thorough manner. In the National Slag Association booklet before us, this is described as follows:

"On the alert for development of new markets for slag, and of new technique in established uses for the material, the association transmits to its membership such information which appears in literature.

"All data procurable which pertain to present or possible uses of blast furnace slag are thus collected, reproduced, classified, and sent to association members.

"Leading technical journals in the construction and engineering field are read by the staff for articles on slag, or for mention of its use. In the majority of instances, such articles or references located are sent to member companies, accompanied by an abstract, together with subject headings for complete cross indexing. A filing system especially adapted has been developed.

"Periodically the talent of the association staff is utilized in the preparation of special surveys along lines of pertinent interest to the slag producer.

Defense Booklet

The National Slag Association has recently issued a new 32-page booklet with a cover entitled "Slag for Defense Construction." It is very well illustrated and describes briefly the preparation and the use of slag for concrete products, railway ballast, pavements, air-port runways, highways, concrete aggregate, etc.

HARRY J. LOVE, 644 Earle Bldg., Washington, D. C., is the managing director of the National Slag Association.

Marquette Adds New Kiln to Des Moines Plant

MARQUETTE CEMENT MANUFACTURING Co., Chicago, Ill., will spend \$2,000,000 to build a practically new plant alongside the present Hawkeye unit at Des Moines, Iowa. The first building on the program will be additional raw storage capacity which will be housed in a reinforced concrete and steel structure 65- x 450-ft. A new wet process kiln, 11½ ft. in diameter and 475 ft. long, will be installed.

New Rock Wool Plant

AMERICAN ROCK WOOL CORP., Wabash, Ind., will build a rock wool plant at Red Wing, Minn., and will open up a quarry. The main building will be 80- x 250-ft., with two cupola furnaces occupying part of the structure. Plant and machinery investment will be about \$250,000. Other plants of the company are operated at South Plainfield, N. J., and at Lagro and Wabash, Ind.

To Make Lime

M. & W. LIME Co., Phoenix, Ariz., will resume the manufacture of lime in the Bluewater area near Grants, N. M., which had been discontinued when the W. A. Thigpen hydrating plant was destroyed by fire two years ago. The old kilns will be restored and enlarged to give a capacity of 50 tons of lime per day. Ralph A. McDonald and F. A. Whillhoite, the new owners, have purchased 80 acres of limestone deposits.

Modernize Atlas Plant

UNIVERSAL ATLAS CEMENT Co., Independence, Kans., plant will be modernized at an expenditure of several hundred thousand dollars, according to an announcement by C. M. Car-



man, superintendent. Some equipment will be scrapped and replaced with new machinery, and several new storage silos will be constructed. Alterations in the present buildings are also contemplated. Much of the new equipment, it is reported, will be in the finish-grinding department and will include new coolers. Most of the work will be done before August 1 so that the plant will be in condition to start deliveries September 1 on its large contract for Norfolk dam. It is said that the contract plus regular business will keep the plant at capacity for two years.

Cement Company Develops New Quarry

SOUTHWESTERN PORTLAND CEMENT Co., Victorville, Calif., is now engaged in developing a new quarry across the valley from its present operations, a distance of about seven miles. A road is under construction from the new quarry to a point on the Mojave Northern Railroad, which will take the material to the plant. Two Diesel-powered trucks have been purchased, each having 35-tons capacity. A 2½-cu. yd. Marion electric shovel has been purchased for use in the quarry.

California's Newest Gravel Plant

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., is now completing the construction of a new sand, gravel and crushed rock plant at Fair Oaks, some 16 miles immediately east of Sacramento. A bottom-dump Euclid hauling unit has been placed in operation transporting material from the deposit to the plant. The plant will have a capacity of approximately 180 tons per hour, and has been designed with the idea in mind that it could be easily converted to fit the many changes in specifications by the various State and Federal users of aggregates.

Idaho's New Gravel Plant

GREEN & HOOVER GRAVEL CO., Lewiston, Idaho, has started up its recently completed washing plant. Highway material and concrete aggregates will be produced. The pit is estimated to contain 100,000 cu. yd. of aggregate.

File Wage-Hour Suit Against Smoot Sand

SMOOT SAND AND GRAVEL CO., Washington, D. C., is fighting a suit filed by the wage-and-hour division, Department of Labor, seeking an injunction to enjoin the company from alleged violation of section 15 of the Wage and Hour Act. The complaint alleges that the corporation has violated the minimum wage provision and the overtime compensation provisions of the act while engaged in interstate commerce, and has failed to keep adequate wage records.

New Rock Concern

LEVY COUNTY LIME ROCK CORP., Williston, Fla., is the name of a new company which has started operations, the principal production being agricultural limestone. Chas. Peacock is president; L. W. Rutland, vice-president, and Mrs. L. W. Rutland, secretary-treasurer.

Quarry Improvements

WHITEROCK QUARRIES Co., Pleasant Gap, Penn., has a number of improvements under way. A new crusher is to be installed, and it is planned to open up a mine, according to Ray C. Noll, general manager. Plans also include the replacement of the lime kilns, trackage, and other equipment.

Buy Colfax Stone Co.

COLFAX STONE Co., Colfax, Wis., which has not operated for a number of years, has been sold to Charles Nelson and Cyril McKeough, Green Bay, Wis.



New \$100,000 steel and concrete plant of Barnsdall Tripoli Corp., Seneca, Mo., which replaced one destroyed by fire. This plant produces 80 percent of the entire tripoli supply sold throughout the world

FINANCIAL NOTES

RECENT DIVIDENDS ANNOUNCED

Alpha Portland Cem. Co.	\$.25	June 25
Canada Cem. Co., Ltd.	6½	
pfd. arrears	1.25	May 30
Canadian Cr. Stone	.10	Mar. 30
Kelley Island L. & Tr. Co.	.25	Mar. 20
Lehigh Portland Cem. Co.	.37½	June 1
Lehigh Portland Cem. Co.		
pfd.	1.00	July 1
Medusa Portland Cem.	.50	April 7
Medusa Portland Cem. pfd.	1.50	April 1
National Gypsum Co. pfd.	1.12½	June 2
Pacific Portland Cem. 6%		
pfd.	1.00	April 29
Riverside Cem. Co. pfd.	1.50	May 1
Schumacher Wall Board		
pfd.	1.50	May 15
Standard Silica Corp.	.15	May 5
Superior Portland Cem.		
Cl. B.	.50	May 1

CONSOLIDATED OKA SAND & GRAVEL Co., LTD., Toronto, Canada, showed a net loss of \$25,197 in 1940 as compared with a net loss of \$31,343 in 1939.

MONOLITH PORTLAND CEMENT CO., Los Angeles, Calif., showed a net loss of \$10,373, after all charges, for the year ended December 31, 1940. This compares with a net profit of \$183,372 in 1939.

PENNSYLVANIA GLASS SAND CORP., Lewistown, Penn., had a net income of \$806,837 for the year ended December 31, 1940. This compares with \$555,878 for a like period in 1939. Net sales in 1940 were \$2,922,401, as against \$2,568,444.

ARUNDEL CORPORATION, Baltimore, Md., reported a net profit of \$859,515 for the year ended December 31, 1940. This compares with \$763,207 for the corresponding period ended December 31, 1939. Gross income in 1940 was \$12,937,295 as against \$6,998,240 in 1939.

MISSOURI PORTLAND CEMENT CO., St. Louis, Mo., has reported the following income account for the years ended December 31:

	1940	1939
Gross sales	\$4,628,938	\$4,307,713
Frgt. and discount	1,030,390	943,156
Net sales	3,598,548	3,364,558
Cost of sales	2,113,479	1,989,548
Selling, etc., expense	569,045	546,059
Oth. deducts., net	9,173	20,233
Depreciation and depletion	390,792	350,656
Operating profit	522,059	458,060
Margin of profit	14.51%	13.61%
Income taxes	124,631	81,404
Net income	397,428	376,655
Dividends	353,008	353,008
Surplus for year	44,420	23,647
Earn. surplus, 1-11	1,180,562	1,147,239
Idle plant adjust.	450,000	
Inc. tax adjust.	cr 8,000	cr 9,875
Earn. surp., 12-31	782,582	1,180,562

SCHUMACHER WALL BOARD CORP., Los Angeles, Calif., set a new high record for earnings for the three months ended January 31, 1941 with a net profit of \$74,776, after all charges. This compares with \$44,198 for the quarter ended January 31, 1940.

KENTUCKY ROCK ASPHALT CO., Louisville, Ky., had a net profit of \$68,072 for the year ended December 31, 1940, compared with a \$70,843 for a similar period in 1939. Net sales were \$672,485 in 1940, as against \$554,374 in 1939.

INDUSTRIAL SILICA CORP., Youngstown, Penn., doubled its income in 1940 over 1939. The comparative statement of income for years ended December 31 is as follows:

	1940	1939
Gross profit	\$454,917	\$295,728
Selling expense	110,819	81,433
Depr., depl., etc.	56,142	58,820
Operat. profit	287,956	155,474
Other income	3,621	8,632
Total income	291,577	164,106
Interest, etc.	34,593	47,242
Federal taxes	31,000	11,000
Net income	225,984	105,865
Earn. surp., 1-11	378,400	278,393
Debits	① 353,482	7,858
Earn. surp., 12-31	248,901	376,400
Times pfd. divs.	2.32	1.09
Earn., pfd. share	\$15.07	\$7.06
No. of pfd. shs.	15,000	15,000
① Includes \$351,577 loss on sale of Dick silica deposit.		

NATIONAL GYPSUM CO., Buffalo, N. Y., reported a net profit of \$1,565,196 for 1940, after federal and Canadian income taxes and excess profits taxes, which compared with \$1,455,237 in 1939. President Baker has stated that since the first of 1941 the upturn in the company's business has been accelerated with sales running about 40 percent ahead of last year.

MICHIGAN SILICA CO., Rockwood, Mich., had a net profit of \$23,585 for the year ended December 31, 1940, compared with \$54,401 for a like period in 1939. Sales in 1940 were \$186,325 as against \$257,314 in 1939.

NORTH AMERICAN CEMENT CO., New York, N. Y., showed a net loss of \$327,094, after all charges, for the year ended December 31, 1940, as compared with a net loss of \$376,626 for a like period ended December 31, 1939.

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., had a very successful year in 1940 with a net profit of \$105,169, after all charges, which compares with a net loss of \$28,060 in 1939. Sales last year totaled \$1,936,802 as against \$1,680,518 in 1939, an increase of 14½ percent. President Humphries said that the improvement in earnings may be in a large measure attributed to the results of the program of plant and equipment modernization which the company initiated in 1938. Over the past three years \$887,596 has been spent to improve facilities. The following officials were granted the right to exercise options to buy 10,000 shares of stock at \$5 par value common: A. K. Humphries, president, 2000 shares; E. J. Goodpastor, vice-president and general manager, 2000 shares; H. W. Senter, secretary-treasurer, 1500 shares; Carroll Stephens, manager San Francisco retail division, 1000 shares; W. L. Neil, assistant secretary and treasurer, 1000 shares; Donald Meek, general sales manager, 1500 shares; and H. E. Keifer, manager East Bay retail division, 1000 shares.

EASTERN MAGNESIA TALC CO., INC., Burlington, Vt., reported a net profit of \$38,037 for the year ended December 31, 1940. The net profit in 1939 was \$35,524.

FLORIDA PORTLAND CEMENT CO., Chicago, Ill., with plant at Tampa, reports a net income, after depreciation and depletion, of \$622,784 for the year ended December 31, 1940. In 1939 the net income was \$507,621. Net sales in 1940 were \$3,930,315, as against \$2,057,037 for 1939.

PEERLESS CEMENT CORP., Detroit, Mich., had a net income of \$366,487 for the year ended December 31, 1940.

ALPHA PORTLAND CEMENT CO., Easton, Penn., has presented the following statement of income for the years ended December 31:

	1940	1939
Net sales	\$7,655,343	\$6,988,706
Operating expenses	4,889,011	4,470,584
Maintenance and repairs	803,518	787,251
Depreciation and depletion	961,147	950,416
Operating profit	1,001,667	780,455
Margin of profit	13.08%	11.17%
Other income	239,470	111,933
Total income	1,241,137	892,389
Fed. income tax	① 294,120	127,714
Income charges	28,933	17,578
Net income	918,084	747,097
Common divs.	958,150	639,500
Surplus for year	d 40,066	107,597
Surplus, Jan. 1	3,395,124	3,313,336
Debits	cr 11,545	25,810
Surplus, Dec. 31	3,366,603	3,395,124
① No liability incurred for excess profits taxes.		

THE WARNER Co., Philadelphia, Penn., presented the following consolidated income account for the years ended December 31:

	1940	1939
Net sales	\$5,641,154	\$4,946,318
Cost of sales	4,206,308	3,647,679
Depreciation and depletion	287,696	333,134
Sales expense	244,083	251,528
Administrative expense	175,976	166,247
Operating profit	727,090	547,730
Margin of profit	12.89%	11.07%
Secur. income	40,897	41,148
Total income	767,987	588,878
Inc. chgs., net	121,192	117,306
Balance	646,795	471,572
Bond int., etc.	338,287	349,561
Bond disc. & exp.	34,549	34,883
Income taxes	*24,047	.....
Net profit	249,912	87,127
Earn. deficit, 1-1....	833,737	937,159
Credits	51,853	19,003
Debits	26,862	2,708
Earn. deficit, 12-31..	558,854	833,737

* No excess profits tax required.

Note: Statements do not take into account estimated net profit of controlled companies not consolidated, which amounted to approximately: 1940, \$14,000; 1939 (as adjusted), \$31,000.

SIGNAL MOUNTAIN PORTLAND CEMENT Co., Chattanooga, Tenn., had a net profit after depreciation of \$232,635 for the year ended December 31, 1940, as against \$345,608 for a similar period in 1939. Net sales for 1940 were \$1,714,039, as compared with \$1,263,169.

PACIFIC COAST CEMENT CORP., operated under lease by the Superior Portland Cement, Inc., Seattle, Wash., reports a net income of \$113,064 for the year ended December 31, 1940, as against \$340,924.

LONGHORN PORTLAND CEMENT Co., San Antonio, Texas, had a net income of \$561,656 for the calendar year 1940, comparing with \$577,560 in 1939.

LOCK JOINT PIPE Co., Ampere, N. J., concrete pipe manufacturers, had gross sales of \$4,707,071 in 1940, as compared with \$9,901,509 in 1939. Net income for the calendar year 1940 amounted to \$659,262 as against \$1,455,393 in 1939.

RIVERSIDE CEMENT Co., Los Angeles, Calif., had a net income for the year ended December 31, 1940, of \$430,481, as compared with \$208,553.

ROCKLAND - ROCKPORT LIME Co., Inc., Rockland, Maine, reported net sales of \$528,323 for the year ended December 31, 1940, as compared with \$483,119 for a similar period in 1939. Net profit, before depreciation, was \$34,214 in 1940, as against \$21,627 in 1939.

PENNSYLVANIA-DIXIE CEMENT CORP., New York, N. Y., has reported a profit, before federal income taxes and excess profits taxes, of \$1,284,381 for the twelve months ended March 31, 1941. This compares with \$399,888 for a similar period ended March 31, 1940. Net sales for twelve months ended March 31, 1941, were \$8,038,119 as compared with \$6,180,932 for a like period ended March 31, 1940. President Miller states that sales for the period were 77 percent ahead of a year ago. He said that the company hoped to pay a preferred dividend early in June.

NATIONAL GYPSUM Co., Buffalo, N. Y., reports a net profit of \$349,255 for the first quarter in 1941. President Baker states that sales are running 33 1/3 percent over a year ago.

HOOSAC VALLEY LIME Co., Inc., Adams, Mass., reported a deficit of \$2,292 for the calendar year 1940, as compared with a profit of \$17,758 in 1939.

YOSEMITE PORTLAND CEMENT Co., San Francisco, Calif., showed the following income account for the years ended December 31:

	1940	1939
Net sales	\$707,910	\$793,281
Cost of sales	609,618	570,170
Sell., etc., expense	113,741	138,096
*Operating profit	\$15,449	85,015
Margin of profit .....	.....	10.72%
Other inc., net	20,074	20,478
Total income	4,625	105,494
Fed. income taxes	17	13,304
Other deductions .....	.....	18,405
Net income	4,609	73,785
Preferred divs.	51,418	102,697
Deficit for year	46,809	28,912
Surplus, Jan. 1	195,011	231,517
Adjustments	\$1,289	\$2,406
Surplus, Dec. 31	146,902	195,011
Times pfd. divs.	0.04	0.72
Earn., pfd. share	\$0.02	\$0.29
No. of pfd. shares	257,092	256,978

* After depreciation and depletion: 1940, \$76,545; 1939, \$78,688.

FEDERAL PORTLAND CEMENT Co., Inc., Buffalo, N. Y., had a net profit of \$15,868 for the year ended December 31, 1940, comparing with a deficit of \$22,195 for a like period in 1939.

DOLESE & SHEPARD Co., Chicago, Ill., had a net profit of \$14,947 for the year ended December 31, 1940. This compares with a profit of \$22,805 in 1939.

GIANT PORTLAND CEMENT Co., Philadelphia, Penn., is seeking to buy dividend arrears units, tenders having been received up to April 30, 1941. Under the recapitalization plan approved in 1940, the company issued dividend arrears units valued at \$31.67 each, and eight shares of

new common for each of the preferred shares outstanding.

LONE STAR CEMENT CORP., New York, N. Y., presented the following income account for the following years ended December 31:

	1940	1939
Sales	\$22,674,274	\$21,065,781
Manufacturing, etc., expense	12,063,718	10,742,863
Selling, etc., expense	2,904,203	2,978,249
Depreciation and depletion	2,605,188	2,674,040
Operating profit	5,101,165	4,690,630
Margin of profit	22.50%	22.25%
Other income	281,391	182,712
Total income	5,382,556	4,873,342
Misc. charges	305,428	278,452
Inc. tax., etc.	1,606,216	1,033,706
Fgn. exch. adj.	13,619	.....
Net income	3,457,293	3,561,094
Common divs.	3,385,807	3,137,014
Surplus for year	71,486	424,080
Earn. surp., 1-1....	10,469,756	10,253,678
Fgn. exch. adj.	\$118,847	191,189
Plt. & eq. adjust.	\$171,553	.....
*Other Debits	30,644	16,812
Earn. surp., 12-31..	10,801,000	10,469,758

* Amount transferred to statutory surplus of subsidiary companies in Argentina and Brazil.

CALAVERAS CEMENT Co., San Francisco, Calif., has reported a net income of \$54,933 for the year ended December 31, 1940, which compares with \$176,911 for a similar period in 1939. Net sales in 1940 were \$1,168,514, as against \$1,590,173 in 1939.

Midwest Agricultural Limestone Meeting

PROBLEMS arising out of the A.A.A. Soil Conservation Program of the Department of Agriculture were discussed at a meeting of the Midwest Agricultural Limestone Institute held at the Palmer House, Chicago, Ill., April 23.

President E. J. Krause, Columbia Quarry Co., St. Louis, Mo., presided, and the meeting was attended by H. M. Hollingsworth, France Stone Co., Toledo, Ohio; Harry Clark, Consumers Co., Chicago, treasurer; Dan Sanborn, Lehigh Stone Co., Kankakee, Ill.; W. N. Carter, National Stone Co., Joliet, Ill.; W. H. Travers, Elmhurst-Chicago Stone Co., Elmhurst, Ill.; Ralph Quelle, Linwood Stone Products Co., Davenport, Iowa; J. R. Bent, Dolese & Shepard Co., Chicago, secretary; and John Spencer, Illinois Agricultural Institute.

It was proposed that the A.A.A. law be strengthened to obtain better qualifications from bidders under form 566. The qualifications, under the suggested change, would be registered, and the law would require acceptance of the lowest responsible bids based on capacity for making deliveries.

Option on Quarry

VALDERS LIME & STONE Co., Valders, Wis., has taken an option on the tax delinquent properties of the Standard Lime and Stone Co., near Manitowoc, Wis. President Barney Brennan of the Valders company contemplates operating the old Standard kilns.

Big Blast

ONE of the largest blasting operations ever undertaken was recently carried out by the Tennessee Valley Authority near Cherokee Dam, Jefferson City, Tenn. About 500,000 tons

of limestone was blasted down for use in making aggregates, using nearly 125,000 lb. of Nitramon.

Move Quarry Equipment

THE PACIFIC COAST AGGREGATES Co., San Francisco, Calif., has completed its operations at the old Atlas Rock plant, just east of Oakdale, Calif., and is dismantling the machinery. Part of the equipment has been shipped to the Pleasanton, Calif., plant, and the machinery for panning gold has been sold to Sonora interests. Other more modern plants

of the company are adequate to meet all demands. W. C. Vaughn, formerly in charge of the Atlas plant, has been transferred to the Fair Oaks plant.

Lime Putty Concern to Make Concrete Pipe

BLACK-BROLLIER, INC., Houston, Texas, has announced the installation of a new plant for the manufacture of concrete pipe. The company now manufactures lime-putty. With the new pipe plant, the company is prepared to supply pipe for sewers, septic tanks, culverts, and straight pipe and fittings, including bell end or tongue-and-groove. George Black, who recently became associated with the company, is well known in the building industry.

To Make Ready Mix

STANDISH BROTHERS, Pullman, Wash., has introduced ready mixed concrete to this area. C. O. and Robert Standish are local business men in Pullman.

Build Pipe Factory

UNION PIPE & CONCRETE Co., Sunnyside, Wash., recently completed the construction of a concrete pipe plant at this location. Yakima Cement Products Co., another Yakima valley concern, also is building a concrete pipe plant at Grandview, Wash.

Size Distribution

(Continued from page 66)

This fact is very important because in the analysis of grindability and grinding plant equipment our computations for efficiency become highly speculative in the greater fineness range. Perhaps our grinding equipment is not so inefficient after all, and what we may have considered low efficiencies in operation may be accounted for by our lack of precision of the amount of new surface created during pulverization, or our failure to accurately establish the standard grindability factor upon which the efficiency must be calculated.

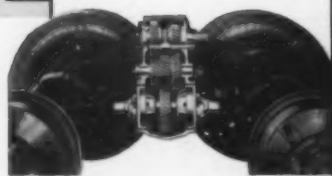
REFERENCES

- (1) Wagner, L. A., "A Rapid Method for the Determination of the Specific Surface of Portland Cement," *Proc. Am. Soc. Test. Mat'ls.*, 33, Part II, pgs. 553-70, (1933).
- (2) Traxler, R. N. and Baum, L. A. H., "Measurement of Particle Size Distribution by Optical Methods," *Proc. Am. Soc. Test. Mat'ls.*, 35, Part II, 457-71, (1935).
- (3) Fritts, S. S., "Average Diameter of Particles Just Passing the 325-mesh Sieve," *Industrial and Engineering Chemistry, Analytical Edition*, Vol. 9, 180, April 15, 1937.
- (4) Wilson, R., "A Method for Estimating the Efficiency of Pulverizers," *A.I.M.E., Tech. Pub.* 810, (1937).

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Upholds Fixed Price For Cement

COLORADO'S Fair Trade Practices Act was upheld by District Judge Jos. J. Walsh in a recent decision in which he granted an injunction against the Perry E. Canfield Lumber Co. from selling cement at prices lower than those set under the Act. The decision upheld constitutionality of the Act, passed in 1937, but criticised the manner in which two manufacturers advised cement dealers of their intent to carry out provisions of the Act.

Talc Mill Installs New Machinery

BRYSON TALC CO., Marion, N. C., has purchased a carload of heavy machinery for the grinding mill. All machinery for the mines located on Pepper Creek has been installed, and production is rapidly approaching capacity, according to Herman J. Bryson, president. Ground talc is used as filler for ordnance shells.

Cumberland to Improve Cement Plant

CUMBERLAND PORTLAND CEMENT CO., Cowan, Tenn., has placed two Easton semi-trailers on Ford trucks in operation. Plans include the addition of Raymond bowl mills for coal, the addition of Sly dust collectors in the packhouse and a second Lee clinker cooler. Modern Valve Bag packing machines will be installed.

Cement Plants Resume Production Schedules

WABASH PORTLAND CEMENT CO., Stroh, Ind., plant, started production in April. Plans for eight or nine months' operation are under consideration. An additional 120 acres of marl deposit has been purchased.

WOLVERINE PORTLAND CEMENT CO., Quincy, Mich., plant, has resumed operation. One of the additions recently made to the plant equipment is a pair of scales to weigh truckloads of bulk cement.

IDAHO PORTLAND CEMENT CO., Pocatello, Idaho, has started up its kiln which has a daily capacity of 1200 bbl. President Eugene Enloe anticipates a very busy year.

PETOSKEY PORTLAND CEMENT CO., Petoskey, Mich., recently started up two of its kilns. Work on a third will soon be completed, and the fourth kiln will be placed in operation in May. Some changes in the electrical equipment have been made during

the shut-down for repairs and maintenance.

MONARCH CEMENT CO., Humboldt, Kans., started its kilns turning recently with the expectation the operations will be continued for some time in supplying defense needs.

Open Quarry

CONCRETE MATERIAL CONSTRUCTION CO., Cedar Rapids, Iowa, has purchased a tract of land from Mrs. Jerry Evans, four miles southwest of Columbus City, Iowa, and is opening a quarry.

From Rails to Trucks

GLENS FALLS PORTLAND CEMENT CO., Glens Falls, N. Y., has changed over from rail transportation to trucks in handling stone from the quarry to the crushing plant. Four new 95-hp. Chevrolet tractor trucks pulling 10-ton Easton side-dump quarry trailer bodies will be used in this service.

Road-Mix Plant Fire

JOHNSTON ROCK CO., near Chico, Calif., suffered a loss estimated at \$42,000 when its asphalt mixing plant was recently destroyed by fire.



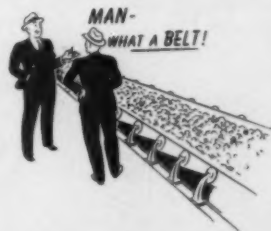
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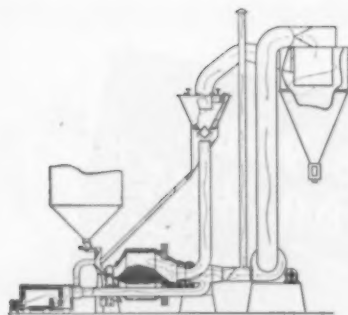


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Cement Production Up

BUREAU OF MINES reports that the portland cement industry in March, 1941, produced 10,600,000 bbl., shipped 10,056,000 bbl. from the mills, and had in stock at the end of the month 25,853,000 bbl. Production and shipments of portland cement in March, 1941, showed increases of 33.9 and 30.3 percent, respectively, as compared with March, 1940. Portland cement stocks at mills were one percent lower than a year ago. All plants reported.

In the following statement of relation of production to capacity, the total output of finished cement is compared with the estimated capacity of 159 plants at the close of March, 1940, and 156 plants at the close of March, 1941:

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

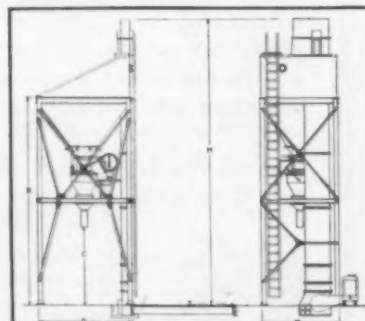
	March 1940	Feb. 1941	Jan. 1941	Dec. 1940
The Month...	36.3	49.8	43.5	42.4
12 Months...	47.5	55.6	54.4	53.1

New Boiler for Cement Plant

PEERLESS CEMENT CORP., Detroit, Mich., is replacing a 15-yr. old auxiliary boiler with a new 45,000 lb. per hour Babcock and Wilcox coal-fired integral boiler.

Recommended Dimensions for Batching Plants

HELTZEL STEEL FORM & IRON CO., Warren, Ohio, has recently published a bulletin on all types of storage bins, batching plants and auxiliary batching equipment manufactured. One of the features of this bulletin is a series of drawings showing the structural details of the various Heltzel

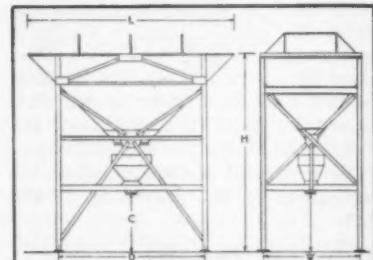


CAP. Bbls.	H	B	D	W
100	33'-0"	23'-0"	11'-0"	9'-0"
150	35'-3"	25'-3"	11'-0"	9'-0"
200	37'-6"	27'-6"	11'-0"	9'-0"
250	39'-9"	29'-9"	11'-0"	9'-0"

BATCHER CAPACITY	DIMENSION C
16 cu. ft.	9'-9"
20 cu. ft.	9'-3"
25 cu. ft.	8'-9"
30 cu. ft.	8'-3"

Bin types H, B, D, W, and respective capacities

zel plants, bins and tanks together with the minimum dimensions recommended for standard capacities. This information and drawings are reproduced herewith for the Heltzel



AGGREGATE BINS

CAP. TONS	H	L	D	W
100	27'-4"	26'-2"	16'-10"	10'-0"
150	28'-10"	29'-2"	19'-6"	12'-0"
200	29'-11"	31'-4"	22'-2"	14'-0"
300	32'-0"	35'-6"	24'-10"	16'-0"
400	33'-7"	38'-8"	27'-6"	18'-0"

COMBINATION BINS

CAP. TONS	H	L	D	W
100	28'-1"	25'-4 1/2"	15'-5 1/2"	10'-0"
150	29'-9"	27'-3"	17'-8"	12'-0"
200	30'-10"	29'-0 1/2"	19'-10 1/2"	14'-0"
300	33'-2"	35'-0 1/2"	22'-1 1/2"	16'-0"
400	34'-9"	35'-7"	24'-4"	18'-0"

BATCHER CAPACITY	DIMENSION C
1 cu. yd.	10'-6"
1 1/2 cu. yd.	9'-6"
2 cu. yd.	8'-9"
3 cu. yd.	7'-9"
4 cu. yd.	6'-9"
5 cu. yd.	5'-9"

CAPACITY OF CEMENT COMP. IN BBLs.

No. COMP.	TOTAL CAPACITY OF BINS (Tons)
100	100
2	250
3	160
4	125

Bin types H, L, D, W, and capacities

wedge type bolted bin and for the Heltzel Model E-1 portable bulk cement plant.

The bulletin also contains many illustrations of Heltzel plants at work and describes their operation. The bulletin is numbered B-31.

Watches for Cement Company Employees

MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, has had the custom of presenting employees serving 25 years with handsome watches. J. B. John, president of the company, recently presented the awards to five employees at the Bay Bridge plant. In all, 49 men have received the award.

Approve Superhighways for Chicago Area

PASSAGE of an enabling act by the Illinois legislature authorizing the appointment of a special highway authority with power to construct and maintain toll superhighways for the Chicago area was voted upon favorably by the City of Chicago planning advisory board.

Buy Cement Plant In Mexico

CEMENTOS ATOYAC, S. A., Puebla, Mexico, has purchased the plant and property of Cementos Indio, S. A., which is also located in Puebla. The Indio plant was built a number of years ago to operate on the wet process, but was never very successful and has been shut down for several years. This plant has a single kiln which will be used by the Atoyac cement company to produce its new masonry cement "Caloyac." The Indio plant will be operated by the Atoyac organization of which F. J. Miller is president and general manager, and Alton J. Blank is executive vice-president in charge of operation.

Housing Projects

SEVERAL large housing contracts have been let during the past month: Housing Authority of Corpus Christi, Corpus Christi, Texas, 100 units to C. C. Hinchberger, and 400 units to C. L. Browning, Jr., costing \$222,847 and \$986,900, respectively; Defense Housing Project, Lexington, Ky., to Whittenberg Construction Co., costing \$475,000; Housing Project, Key West, Fla., 50 units to Southeastern Construction Co., Miami, Fla., costing \$150,000.

To Produce Glass Sand

A NEW GLASS SAND PLANT will probably be located on the Lawrence farm south of Sulphur, Okla., according to newspaper reports. J. M. Tucker, Oklahoma City, formerly associated with an earlier glass sand plant at Sulphur, has been testing the deposit and conducting preliminary investigations.

Install Block Machines

MAULE INDUSTRIES, INC., Ojus, Fla., has installed its second large Besser automatic Vibrapac block machine.

HENRY R. SINGELTARY, a former contractor, has started in the concrete products business at Bradenton, Fla. He is reported to have purchased a Clarkson vibrating block machine.

TRI-MONT BLOCK & SILO CO., Trimph, Minn., is reported to have purchased a Consolidated block machine made at Holland, Mich. The company recently purchased a cut-off machine to make odd sizes from standard size block.

NARANJA ROCK CO., Naranja, Fla., has purchased two Stearns Clipper stripper block machines to be installed

about May 1. A Yale & Towne lift truck also has been added to the equipment for handling block in the plant and to storage.

BURTON CAST STONE CO., Tampa, Fla., has purchased a B1 model Blystone mixer.

Wage Grant to Enlisted Men

THE M. J. GROVE LIME CO., Lime Kiln, Md., has announced it will continue payment of salaries for three months from the date of entry into service of all employees who have

been regularly employed for one year or longer. Smaller amounts will be granted to employees having less service with the company.

Medusa to Guarantee Draftees' Jobs

MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, has announced that any drafted employees will be given one-half month's pay, and that his group life insurance policy will be kept up by the company, with his old job saved for his return after the year's training period.



TRADE DEMPSTER MARK DUMPSTER
Reg. No. 353484
BUCKETRUX

Pays its Way

Get "unavoidable" lost time in loading and hauling and you cut quarry costs. This can be accomplished with the Dempster-Dumpster-BucketTrux. Buckets take the place of trucks, providing the efficiency of an entire fleet but with the cost of a single truck. One truck unit can serve five to ten buckets, depending on the length of haul.

Capacities range from 4500-lbs. to 12,000-lbs. net Payload. Sizes 1½ cu. yds., 2 cu. yds., 2½ cu. yds., 3 cu. yds., 4 cu. yds. for the heaviest materials. Three (3) Types of Buckets furnished:

Drop-Bottom, Skip and Tilt Type

All are standard and used interchangeably with Standard Hoisting Units.

Bigger profits are "In the Bucket."

DEMPSTER BROTHERS, INC.
KNOXVILLE TENNESSEE

Agstone Specifications of A. A. A.

Different specifications are influenced by available sources of materials and production methods

SPECIFICATIONS vary widely between regions and even within some states due largely to the availability of materials and methods of production. In the North Central region, limestone ground so that at least 90 percent passes 8-mesh, with all the fines included, will receive full soil-building credit. However, where ground limestone is less available a more finely ground product is used.

For example, in the Northeastern region, 100 percent of the ground limestone must pass a 20-mesh sieve, with all the fines included. In most states, magnesium oxides or carbonates are accepted as having a greater neutralizing value than that of calcium oxides or carbonates, and the specifications call for calcium oxide or carbonate equivalents. Some states give no credit for magnesium compounds, and some communities outside the magnesium deficiency areas, but receiving bulk ground limestone in open-top cars, often prefer dolomite material because of its non-caking qualities when moist. Farmers generally prefer ground limestone moist as it is easier to spread.

State Variations

In the East Central region, the specifications call for 90 percent CaCO₃ through 10-mesh, except in Delaware and Maryland where the CaO and MgO combination must be 95 percent through 20-mesh. In the North Central region, the specification is 80 percent CaCO₃ availability with 90 percent through 8-mesh. In the Northeast region, New Jersey calls for 50 percent availability CaO and MgO with 100 percent through 20-mesh, 60 percent through 100-mesh; in Connecticut, Massachusetts, Maine, New Hampshire, and Rhode Island, availability is 50 percent CaO with 100 percent through 20-mesh.

In New York and Pennsylvania, availability is 50 percent CaO and MgO with 100 percent through 20-mesh. In the South, availability is 90 percent CaCO₃, except in South Carolina where it is 88 percent. Screen analysis in Florida, Mississippi, South Carolina, Georgia, and Louisiana must be 98 percent through 10-mesh and 40 percent through 100-mesh; Texas and Oklahoma, 95 percent through 10-mesh and 40 percent through 60-mesh; and Alabama and A and B areas in Arkansas, 98 percent through 10-mesh and 50 percent through 60-mesh.

Five delivery methods may be employed: F.o.b. quarry-rail; f.o.b. quarry-truck; f.o.b. local destination siding; delivered on the farm; and spread on the field. In Illinois the last method is most prevalent, except in the southern part of the state. About 15 years ago, 80 percent of the agricultural limestone was hauled by rail, the balance by truck, but today the position is reversed. Demand is now spread more uniformly throughout the year, but the big season in Illinois is in the winter and fall months.

Study Bomb Shelter Designs

EXTENSIVE STUDIES are being made in this country of different bomb shelter designs to protect American cities in case of attack. A. J. Boase, of the Portland Cement Association, reported at the annual convention of the Missouri Society of Professional Engineers in Kansas City, Mo. Great Britain, Mr. Boase said, is using reinforced concrete walls 7 ft. thick in its bomb raid shelters which are effective in saving people from bomb fragments. However, 500-lb. bombs have embedded themselves from 70 to 80 ft. in the ground and upon exploding created enormous craters. It would be difficult to construct shelters which would afford protection from bombs of this type and larger if direct hits are made.

Mr. Boase reported that while England, Germany and France are far ahead of us in the use of concrete, this country has a far superior quality. Germany, he said, is so short of steel that its bombers are using shells of reinforced concrete.

Open Branch Plant

PACIFIC ROCK AND GRAVEL CO., Los Angeles, Calif., has opened a branch plant at East Road and South Normandie avenue. Bunkers have been erected for the storage of rock, sand and gravel. Ready mixed concrete also will be distributed from this point.

AAA Requires Phosphate With Lime

ALABAMA AAA specifications for winter legumes are said to require them to be "fertilized with at least 300 lb. of 16 percent superphosphate or 500 lb. of basic slag per acre unless the land has been well fertilized for the previous crop." In fields where it

is known that there is a deficiency of lime, lime must be applied.

THE ROCKFORD ROCK BY-PRODUCTS Co., Columbia, Tenn., is reported to be grinding mixtures of high grade phosphate rock with muriate of potash, using a JB grinding mill and mixer, for fertilizer. Mixtures with sulphate of ammonia in addition to potash also have been ground.

Unusual Dust Collector Installation

LOUISVILLE CEMENT CORP. has made an installation of dust collectors at its natural cement plant at Akron, N. Y., which has some unusual features. One Norblo unit is in the pack-house and the other is in the finish department. In the finish department where cement is being made from natural rock, the dust collector installation was divided up so that the uncalcined rock dust was separated from the calcined dust. However, each of the units may be operated separately.

Sand-Lime Brick Production and Shipments

ELEVEN active sand-lime and brick plants reported for March and eleven for February, statistics for which were published in April.

AVERAGE PRICE FOR MARCH

	Plant Price	Delivered Price
Milwaukee, Wis.	\$10.00	\$12.00
Sebewaing, Mich.	10.00	....
Seattle, Wash.	15.00	16.00
Syracuse, N. Y.	14.00	20.00L/C 16.00C/L
Watertown, Mass.	12.50	13.50

STATISTICS FOR FEBRUARY AND MARCH

	February	March
Production	1,795,600	1,831,200
Shipments (rail)	129,000	976,000
Production (truck) ..	1,614,702	1,190,621
Stock on hand	2,139,375	882,919
Unfilled orders	2,165,000	650,000

†Eleven plants reporting: incomplete, three not reporting production, three not reporting stock on hand and six not reporting unfilled orders.

†Seven plants reporting: incomplete, three not reporting production, two not reporting stock on hand and four not reporting unfilled orders.

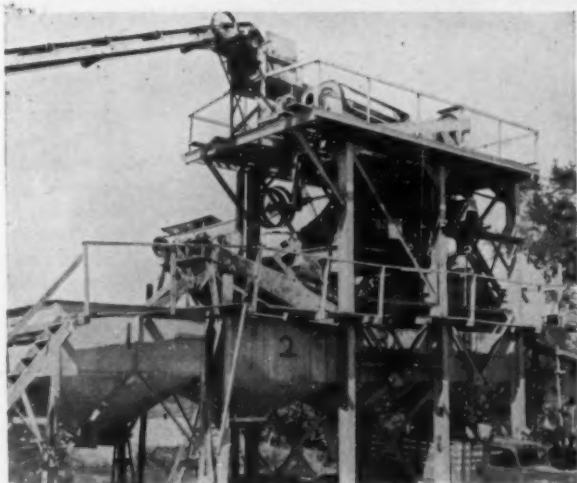
Concrete Pavement Yardage

AWARDS of concrete pavement for March, 1941, and the first three months of 1941 have been announced by the Portland Cement Association as follows:

	Square yards awarded	
	During March	First Three Months
Roads	1,530,965	5,163,127
Streets and Alleys ..	1,007,430	3,366,138
Airports	1,028,707	2,087,684
Totals	3,567,102	10,616,949

ROCK PRODUCTS

Depend on DIAMOND for Volume Production at Low Cost

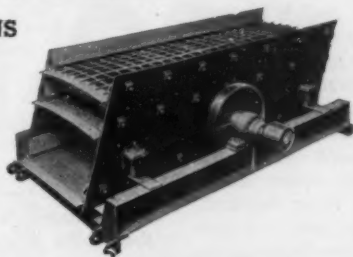


Diamond crushing, screening, washing and conveying equipment can be furnished in any combination to suit the particular needs of any contractor. Each piece of Diamond equipment is designed along the most modern lines to give the maximum production at lowest cost.

Our large engineering staff will gladly consult with you, and make suggestion sketches and recommendations to suit your particular needs.

VIBRATOR SCREENS

There are many reasons why Diamond vibrator screens are famous among quarry men. They are positive in action, may be hung with shackles or suspended by cables and are adjustable both for balance and angle of incline.



ROLL CRUSHERS
JAW CRUSHERS
CONVEYORS
CONVEYOR ROLLS
ELEVATORS
TRIPPERS

GRIZZLIES
FEEDERS
BINS
SCALPING SCREENS
SCRUBBER SCREENS
DRAG WASHERS

The Diamond Portable quarry plant is designed to fill a need for a crushing and elevating plant that can easily be moved from place to place. Mounted on substantial steel chassis with anti-friction bearing wheels. An ideal plant for low cost operation.

ASK US for complete information and prices on any items of quarry equipment, and for the services of our engineering department for designing of complete plants. ADDRESS DEPT. HP5.



DIAMOND IRON WORKS, INC.



One Good SMITH-MOBILE Deserves Another!

Pacific Coast Aggregates, Inc. sent in their initial order for two Smith-Mobile Truck Mixers in July 1939. Another order for two machines followed the same month — three more in October 1939 — three more in November 1939 — seven more in February 1940 and three more in January of this year.

Surely, such preference must be deserved. The many repeat orders came as a result of satisfactory performance. The company liked the HIGH DISCHARGE feature ... CONTROLLED DISCHARGE without segregation ... VISIBLE MIXING ... Fast FEED CHUTE Charging ... Greater hauling capacity ... Larger radius of spout distribution, etc.

4 sizes available — 2 cu. yds. to 5 cu. yds. as truck mixers — (2½ cu. yds. to 6 cu. yds. as agitators). Write for catalog 198-A.

The T. L. SMITH COMPANY
2885 N. 32nd STREET, MILWAUKEE, WIS.



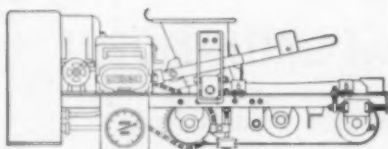
SMITH-MOBILE
THE Modern TRUCK MIXER and AGITATOR

A 3346-K

**FEEDS
WEIGHS
RECORDS
TOTALS
PRINTS**

"FEEDOMETER"

It is the latest thing in an accurate direct reading sturdy Constant Weight Feeder.



HARDINGE
COMPANY, INCORPORATED - YORK, PENNSYLVANIA
NEW YORK, CHICAGO, SAN FRANCISCO, TORONTO



**Start Right
AT THE QUARRY
Use HARDSOCC**

Drills and Compressors

**The LITTLE WONDER
COMPRESSOR**

Single and double units—60 and 120 cu. ft. capacity. Low initial cost . . . low operating cost . . . low maintenance cost . . . entirely automatic.

HARDSOCC ROCK DRILLS

V-55 with new type valve C7 and C8, valveless and fully air cushioned.

Write for New Catalog

HARDSOCC Drill Company
Box 376, OTTUMWA, IOWA

**A.S.T.M. Standards
on Cement**

AMERICAN Society for Testing Materials has published a 107-page compilation of its standards on portland cement for 1940-1941, including all the specifications and test methods issued by A.S.T.M. Of particular interest are the new tentative specifications covering five types of portland cement (C150-40T) and the newly standardized test for autoclave expansion (C151-40T).

Other specifications cover portland (C9-38), high early strength portland, natural and masonry cements, and sieves for testing. Testing procedures that are covered include chemical analysis, sampling and physical testing, and other specifications pertain to the compressive strength of portland cement mortars and turbidimeter finenesses of portland cement. Copies of the publication are available at A.S.T.M. headquarters, 260 S. Broad St., Philadelphia, Penn., at \$1.00 per copy.

**"Family Album"
Makes a Hit**

MONARCH CEMENT Co., Humboldt, Kans., made a big hit with those who attended the Southwestern Lumbermen's Convention at Wichita recently and also with the many readers of its house organ "Scan." In its booth at the convention it had a portrait camera and an array of gay-nineties coats, hats, ties and moustaches for taking humorous photographs. All the photographs, properly identified, were then made into an old-fashioned picture album and sent out as the 28th issue of Scan to those photographed and also to those regularly receiving the magazine, who undoubtedly know many of the faces in the "album."

Open Quarry

UNIVERSAL ATLAS CEMENT Co., New York, N. Y., has reopened its quarry near Pine Island, N. Y., which has been shut down about 2½ months. Fred Babcock, superintendent, recently completed 33 years of service with the company.

**Good Plastering
With Gypsum**

GYPSUM ASSOCIATION, Chicago, Ill., has released a new beautifully-illustrated publication, "The A B C's of Plastering" which contains a wealth of information on the fundamentals and recommended practices for plastering, to assist architects in inspecting and in getting good plastering.

Some of the important points covered are proper thickness of plaster,

the quality and quantity of sand desired, workmanship and ventilation. Results of tests conducted to show the adverse effects of over-sanding plaster are given graphically and illustrated with photographs.

**Lime as a Stabilizer
of Clay Roadbeds**

NATIONAL LIME ASSOCIATION, Washington, D. C., has published bulletin 325 on "Stabilization of Clay Roadbeds with Lime" by Sherman D. Lesesne, Department of Chemistry, Oklahoma City University. Conclusions as to the value of hydrated lime in stabilizing so-called gumbo clays are based on a series of laboratory investigations and on field applications.

The method of stabilizing clay roads with hydrated lime, according to the bulletin, is a comparatively simple procedure.

In preparing a road base the soil usually is plowed to a depth of 6 to 8 in. and the clods are broken up as fine as possible with a disc. The clay is mixed thoroughly with the correct percentage of lime and the optimum percentage of moisture as determined by laboratory tests. The water carries the lime with it as it is absorbed by the clods and the clay becomes as friable as sandy soil.

Immediately after the treated roadbed has been rolled with a tamping roller, the roadbed should be covered either with the usual concrete or asphalt road that is being built or with an asphaltic topping (crushed rock and asphalt) about ¾- to 1-in. thick.

**Proposes State
Cement Plant**

REPRESENTATIVE W. J. PENNOCK has proposed that the State of Washington go in the cement manufacturing business to make its own portland cement and for general sale, claiming that the state and cities could save \$2,000,000 yearly. The highway department used 1,000,000 bbl. of cement for road construction in 1939.

**To Produce
Crushed Gravel**

RIVER SAND AND GRAVEL Co., Owensboro, Ky., is rebuilding its land plant at Owensboro to produce crushed gravel. New equipment includes a 30-in. Stedman impactor, a 3- x 8-ft. Screen Equipment Co. "Seco" vibrating screen and Webster conveying equipment. The company dredges on the Ohio River and, until now, had produced only uncrushed gravel and sand.

MAXIMUM HAULING . . .

At A Minimum Cost!



At the quarry, where smooth, quick power is a vital factor; the Lima Shay Geared Locomotive is an important production unit. Lima Shays are designed to haul maximum payloads over the toughest grades quickly and economically.

The design of the Shay, with all parts readily accessible, facilitates the job of lubrication, adjust-

ment, or repairs. Investigate the full possibilities of Lima power in your quarry.

LIMA LOCOMOTIVE WORKS, Incorporated
LIMA, OHIO

Sales Office: 60 E. 42nd St., New York, N. Y.

OSGOOD



THE ORIGINAL HEAVY DUTY ROCK SHOVELS

have been moving rock for hundreds of satisfied owners, ever since Count de Lesseps first tried to build the Panama Canal in 1882-83.

*Let us send you our new Catalogs.
They tell all about OSGOOD.*

THE OSGOOD COMPANY
MARION, OHIO



**SAUERMAN efficiency
means greater economy
and higher PROFITS!**

The above screening plant turns out 400 tons of graded aggregate per day and is kept supplied with raw material from a gravel bar by a 1/2-cu. yd. Sauerman Blackline Cableway.



This shows Sauerman Drag Scraper handling open storage of phosphate rock at large drying plant.

Excavating and stockpiling is simplified by using a SAUERMAN Drag Scraper or Cableway.

These machines dig, haul and dump in one economical straight-line operation. Readily adaptable to varying digging conditions, they will move a given yardage in less time than any other machines of comparable price.

Because they require but a single operator, consume little power in operation, and require practically no maintenance, they are extremely profitable to use.

Write for Catalog.

SAUERMAN BROS., Inc.
430 S. Clinton St. CHICAGO

Sauerman LONG RANGE MACHINES

New Agstone Plants

ARTHUR OVERGAARD, road contractor, has built a \$20,000 limestone crushing plant at the Zumstine Pit near Elroy, Wis., to produce fine agricultural limestone.

THE STANDARD SUPPLY Co., and Harvey Archer of McConnellsville, Ohio, will crush rock for agricultural limestone. Standard will furnish the crushing equipment and Mr. Archer will supply the limestone from his quarry on the Keyes farm.

SOUTHERN OHIO PRODUCTS Co., has been organized with a plant on Route 75 between Lawrence Furnace and Pedro near Ironton, Ohio. The plant will crush limestone for agricultural purposes.

Gravel Plant Fires

CENTRAL IOWA SAND & GRAVEL Co., Des Moines, Iowa, lost a sand dredge barge by fire. The loss, estimated at \$35,000, included a 300-hp. electric motor and pump.

BARTON SAND, GRAVEL AND ASPHALT Mix Co., Patuxent, Md., plant was recently destroyed by a fire with a loss of \$40,000.

LEXINGTON SAND AND GRAVEL Co., North Lexington, Mass., suffered the loss of its screening plant by a fire which resulted in damages amounting to \$40,000.

AUTOMATIC GRAVEL PRODUCTS Co., Muscatine, Iowa, was almost completely destroyed by a fire which swept through the plant buildings late in March. The \$20,000 loss was covered by insurance.

Steel-Locked Block

V. H. POPPA, Petersburg, Va., manufacturer of concrete block, cast stone, concrete vaults, concrete pipe and concrete curbing, has a patent pending on a new concrete block designed for heavy construction. The construction principle consists of two heavy blocks cast to permit the insertion of a steel bar which holds them together, with provisions to fill the aperture with concrete if thick walls are desired.

Motor Carrier Regulations

INTERSTATE COMMERCE COMMISSION has published a handy little booklet covering revised "Motor Carrier Safety Regulations" that is for sale by the Superintendent of Documents, Washington, D. C., for 20 cents. The

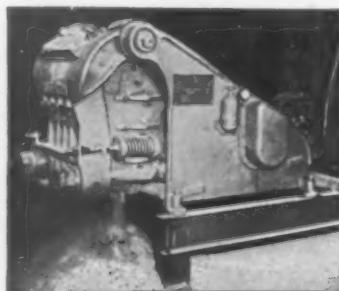
book is printed in six parts, covering the qualifications of drivers, the driving of motor vehicles, parts and accessories necessary for safe operations, the reporting of accidents, hours of service of drivers and requirements for inspection and maintenance.

Recent Quarry Developments

IT IS PLANNED to open a quarry to produce agricultural limestone near Brandon, Miss. L. I. Jones and Hugh Hopper of State College, and Homer Casteel, Canton, Miss., recently visited the site of the proposed plant to make arrangements for installation of equipment.

CONCRETE MATERIALS Co., Waterloo, Iowa, has set up a portable crushing plant in the Whitman quarry south of Lisbon, Iowa. Two road jobs in this territory will require 11,000 cu. yd. of material.

CLAUDE BRONAUGH and Everett Hendricks of New Ross, Ind., have opened up a quarry near this town for the production and distribution of agricultural limestone. Diesel power is used, and the production will be 80 tons a day.



**Less
WEIGHT**

**Less
POWER**

**CRUSHES
FASTER**

Save Money!

**Make bigger profits with
Kue-Ken Balanced Crusher**

On job after job Kue-Ken Crushers are bringing extra profits to owners. One man with a Kue-Ken No. 30 crushes a 55 ton carload of rock in just five hours . . . the crusher previously on the same job required 30 hours to do the same work. Another owner crushes 43,000 tons with a single set of jaw plates where his previous crusher required new jaw plates after crushing only 9000 tons. One user in Peru says . . . "the Kue-Ken paid for itself, transportation and installation in the first three weeks operation." You can't overlook results like these and the many other reports from Kue-Ken owners. This sensa-

tional rock crusher with the new better principle of operation sets a new record on every job. Completely balanced mechanism runs in bath of cool oil. It's vibrationless . . . runs smooth as a limousine . . . requires a fraction of the power needed for conventional crushers yet rock is crushed faster, finer, better at a single pass.

It'll Cost you Nothing to Get Full Information.

Write today for bulletin No. 601. Give us details of your crushing problem and you'll receive a straightforward answer . . . without obligation.

STRAUB MFG. CO.

546 No. Chestnut St.

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CERTIFIED
STEELS**

LARGE STOCKS...IMMEDIATE SHIPMENT

Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Beams and Heavy Structural, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes, Mechanical Tubing, Rivets, Bolts, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.



**McLANAHAN
EQUIPMENT
CRUSHERS**

Single and double roll and jaw crushers, hammer mills, super dry pans—steel log washers and scrubbers, sand drag, revolving and vibrating screens, elevators, conveyors, dryers, jig, hoists.

SCREENS

Complete portable, semi-portable and stationary crushing, screening, and washing plants for different capacities of any materials.



McLanahan & Stone Corp.

Established 1835
HOLLIDAYSBURG,
PENNSYLVANIA

Vibrations Due to Quarry Blasting

U. S. BUREAU OF MINES has published Progress Report 3 in its report of investigations (R. I. 3542) on "House Movement Induced by Mechanical Agitation and Quarry Blasting," by J. R. Thoenen, S. L. Windes and A. T. Ireland. This report, one of several made on ground vibrations resulting from quarry blasting, is directed particularly to the effect of ground vibrations on residences and other structures.

In this study, the use of a mechanical shaker to induce vibrations under varying conditions is discussed. The objective was to ascertain the manner in which residential-type structures vibrated, to correlate mechanically induced vibrations with ground vibrations from quarry blasts and to ascertain an index of damage for ground vibrations.

Houses studied included a two-story and a three-story frame structure with a concrete foundation; a large, rambling frame structure of 23 rooms; a two-story dwelling on a concrete foundation with stucco finish on the first story and clapboard above; a garage of stone and concrete wall construction covered with cement stucco, a two-story brick apartment building; one-story frame bungalow; one-story stucco and brick building; a steel frame, wood-enclosed quarry "washer" building and others of similar construction.

One of the conclusions of these studies was that for houses on the same general construction as those studied, the vibration necessary to produce damage is much greater than that experienced from the average quarry blast. A definite correlation between mechanically-induced vibrations and those resulting from blasting was proved.

A.S.T.M. Committee on Concrete

AS A RESULT of the meetings of Committee C-9 on Concrete and Concrete Aggregates held during A.S.T.M. Committee Week in Washington, four important new tests and specifications are to be offered to the society at its annual meeting in June in Chicago for publication and approval as tentative standards. The three test methods for which there has been definite demand will cover the sampling of wet concrete, methods of determining volume of air entrained in concrete, and standardized procedures for determining the thickness of cores drilled from a concrete structure.

The proposed new tentative specifications for ready-mixed concrete which if accepted will comprise a tentative revision of the existing standard covering this material, C94, include a number of improvements brought about in part by progress in this industry, and increasing demands for the material. In proposing the new requirements, Committee C-9 felt it desirable to keep the present standard in effect for the time being.

Other recommendations which will be offered involve revisions in the following tests and specifications:

Method of Test for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate (C88-39T).

Method of Test for Abrasion of Coarse Aggregate by Use of the Los Angeles Machine (C131-39).

Specifications for Lightweight Aggregates for Concrete (C130-39).

Sell Quarry

FRANK J. LAUBIS, La Rue, Ohio, has sold his quarry to Grover Snyder and Lester Clymer. Snyder & Clymer Co. are general contractors.

Collecting
and SELLING Dust
THAT PREVIOUSLY IMPAIRED WORKING CONDITIONS..
AND CAUSED EXCESSIVE MACHINERY WEAR.

PARSONS OVAL BAG DUST

ARRESTORS are collecting dust from rock crushers, screens, elevators — and in cement plants from raw grinding, to finish mill and to bagging machines.

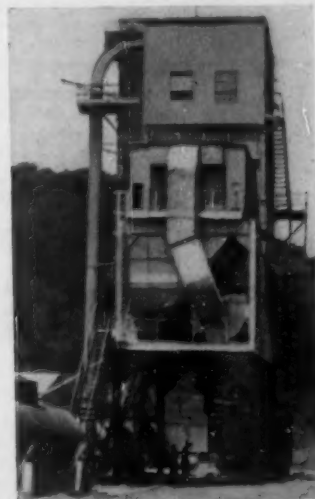
AND THEY ARE DOING A REAL JOB OF IT — because the oval bags DO NOT PLUG even when handling dust from moist materials — and are so durable, they will go for an average of more than ten years without need of replacement.

Also, you will find greatest durability in the sturdy, quality-built working parts and case.

Get full particulars NOW — write for BULLETIN DA-8.



Parsons Oval Bag Dust Arrester collecting dust at cement mill.



Parsons Oval Bag Dust Arrester collecting all dust from a stone crushing plant—this dust is being sold as a filler.

Complete Line of Dust Arrestors

Continuous Automatic—Oval Bag Type
—Unit Type—All-Metal Parsons Centrifugal.

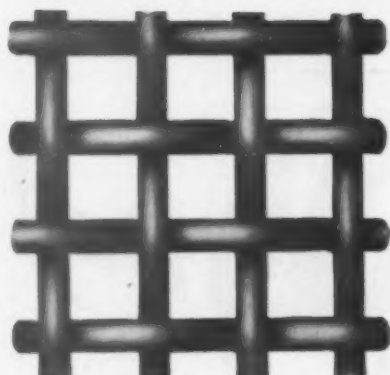
Built by
PARSONS ENGINEERING CORP.
CLEVELAND, OHIO



ROEBLING

ABRASO SCREEN

TRADE JERSEY



ROEBLING STEEL Assures Long Life

Roebling "Abraso" Screening is made of special steel—manufactured by custom methods in Roebling's own mill. It is steel that offers maximum resistance to the BEATING of stone and gravel.

To further assure long screening life, Roebling controls every step of manufacture from steel making to fabrication.

Roebling "Abraso" Screening is available for every sizing, cleaning and grading service.



JOHN A. ROEBLING'S SONS COMPANY

TRENTON
NEW JERSEY

Branches in Principal Cities Export Division: 19 Rector St., New York, N.Y., U.S.A. Cable Address: "Roebling's", New York



MODEL 51

BLAST HOLE DRILL

Is a new and better answer to one tough problem of quarry operators and rock cutting contractors.

It is a night-and-day rock fighter with more built-in power, shock endurance and well drilling science than you have ever seen in a well drill up to now.

It has a welded and riveted steel frame, bigger shafts and bearings, distinctive tool-guide, power derrick-raiser, mast-head shock absorption, Keystone spudding system and stroke adjustment, dependable traction with convenient independent crawler control for easy steering and many other good features of design.

What makes a good blast hole drill? We print a booklet that tells the answer. It will interest you, make money for you. Ask for it.

KEYSTONE DRILLER CO.
Beaver Falls, Pa.



Lessons In Arc Welding

WELDING has come into increasing use in the rock products industry, and today practically every plant has welding apparatus of some kind. For those companies equipped with arc welding apparatus, two new books compiled by the Lincoln Electric Co., Cleveland, Ohio, are of particular interest.

"Lessons in Arc Welding" presents the fundamental facts of welding with numerous illustrations which will enable the operator to use the arc welding process successfully. As the name of the book implies, the 51 lessons were actually prepared from a course in the company's welding school, and progressively take the student through the various steps in making different types of welds. This 135-page book may be obtained for 50 cents.

"Simple Blueprint Reading" is another book published by this company. It is designed particularly to help the welding operator understand drawings and the symbols employed by the draftsman. The numerous illustrations refer principally to welding and welding symbols, but the purpose of the book is not to teach mechanical drawing although the fundamentals of the art are carefully outlined. This book complements "Lessons in Arc Welding," and is a valuable addition to the shop or welding operator's library. It contains 138 pages with many illustrations, and may also be obtained from the Lincoln Electric Co. for 50 cents.

City Buys Stone Saves Money

IN SPITE of opposition from the Socialist party, the City of Milwaukee, Wis., has decided to close its quarry and buy crushed stone from privately owned quarries. Walter M. Swietlik, commissioner of public works, said that the cost of producing stone at Currie Park quarry delivered at the job was \$1.22 a ton compared with a delivered price of \$1.06 a ton from private quarries. The city uses about 50,000 tons a year.

Perfect Safety Records

LEHIGH PORTLAND CEMENT Co., Allentown, Penn., had seven plants that operated through the year 1940 without a lost-time accident. These plants, some of which have several consecutive accident-free records, are located at Sandt's Eddy and Fogelsville, Penn.; Mitchell, Ind.; Mason City, Iowa; Oglesby, Ill.; Birmingham, Ala.; and Union Bridge, Md.

Buys Fleet of Giant Truck Mixers

THE COLONIAL SAND & STONE CO., INC., New York, N. Y., has purchased a fleet of giant truck mixers having an 8-cu. yd. payload (equal to 16 tons of mixed concrete). These units were developed by The Jaeger Machine Co., Columbus, Ohio, and are similar to the 5½ cu. yd. New York Special model.

Mounted on a six-wheel truck powered with a 150 hp. Diesel engine, the complete unit is approximately 26 ft. long, weighs 31½ tons when fully loaded, and stands 12 ft. high. The mixing drum is driven direct from the truck engine and, by means of a vacuum control, the operator is able to start and stop the 16-ton load of the revolving drum merely by flipping a valve at the steering wheel.

There are two top charging doors on the drum. After enough material to produce 5 cu. yd. of concrete is received through the first door, the machine then moves forward to bring the second door under the charging hopper where the remainder of the 8 cu. yd. batch is received.

Total capacity of the water tank is 325 gal., consisting of mix, flush and tempering water, all of which are controlled from a single "Uni-Valve" panel on the tank. A special aluminum accuracy chamber encloses the syphon shut-off in the tank so that accuracy of water measurement cannot be affected by splashing or surging of main body of water.

Purchase Mixer Unit

GENERAL MATERIALS CO., St. Louis, Mo., has purchased a Mixermobile for the elevation and distribution of ready mixed concrete on the job.

To Open Marl Deposit

MARL DEPOSITS found in large tonnage in Cheam Lake near Chilliwack, British Columbia, are to be exploited. A small pilot plant is recovering be-

tween 4 and 5 tons per hour from the lake, and analysis shows a high calcium carbonate content. Tests indicate there are a million cubic yards of the material.

Panama Canal Construction

PACIFIC REPUBLICS LINE has asked the maritime commission to modify its subsidy to permit operation of monthly ship service between Puget Sound ports and the Panama Canal. A new rate of \$7 a ton on cement from north Pacific ports to the canal is an important factor in the attempt by the ship line to establish the service. The new rate enables northwest cement companies to compete with California and Gulf concerns.

Expect Phosphate Prices to Go Higher

WHILE the immediate result of the new world war is a lowering of prices, it is expected that prices will again work higher as they did in the last world war. Monsanto Chemical Co., plans to double its capacity for the manufacture of yellow elementary phosphorus.

Damaged by Fire

WILLIAM F. KOENIG CO., Cincinnati, Ohio, concrete products manufacturers, suffered a \$10,000 loss due to fire which practically destroyed its plant buildings early in February. The fire was believed to have started in the boiler room.

Fire Damages

WHITE GRAVEL CO., Camden, Ohio plant was damaged to the extent of \$3000 by fire. Operations were delayed a month for repairs.

To Build New Plant

EILERS QUARRY, Breese, Ill., has had an active season producing agricultural limestone. Joe Eilers, manager and owner, is planning to build a new plant this Fall.



Made of
Acid Open Hearth
Steel Wire

Round Strand
Flattened Strand
Preformed
Steel Clad
Non-Rotating

The Service Record of this wire rope continues to make and hold friends.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

Established 1857

5909 Kennerly Avenue

St. Louis, Mo.

New York — Chicago — Denver
San Francisco — Portland — Seattle

A BLENDER A MIXER

and Unequalled in Its Exactness



The Automatic Feeder-Weigher-Conveyor

These efficient, accurate, economical weighing and feeding machines have proven their value to operators of cement mills, for accurately proportioning stone and clay — also clinker and gypsum by weight and not by volume.

Also being used for weighing and feeding materials to all types of Grinding Mills.

The Poidometer is self-contained. The scale beam is graduated in pounds or kilos, and can be set at whatever amount of material may be required per foot of belt travel; the gate is then adjusted to suit this weight, and the machine will deliver the pre-determined amount of material with an accuracy of ninety-nine per cent.

Write for Catalog No. 2 and get Complete profit-producing facts!

SCHAFFER POIDOMETER CO.
2828 Smallman St. PITTSBURGH, PA.

Leaky
HEAVY DUTY

No-Blind VIBRATING SCREEN with TRI-VIBE —for Fine Mesh Screening

All Out Defense Against Blinding

Tri-Vibe Equipped Type C Leaky Screens are the most efficient in fine mesh screening — because open meshes are maintained at greater capacities by Leaky triple-powered vibration.

Leaky
HEAVY DUTY

Vibrating Screen. Write for Bulletin No. 14-H

THE DEISTER CONCENTRATOR COMPANY
The Original Deister Co., Est. 1906
915 GLASGOW AVE. FORT WAYNE, IND.

Grinding Marble for Pigment

THE WHITE PIGMENT CORPORATION, Rutland, Vt., has been formed by joining the interests of the Vermont Marble Company and the Thompson-Weinman Co. The entire equipment of the latter company will eventually be moved to Florence, Vt., where the marble grinding plant will be located. The new corporation will manufacture from marble by a secret process a filler to be used in paper, rubber, paint and linoleum.

Rock Asphalt Plant

LIBERAL ROCK ASPHALT Co., Liberal, Mo., has plans for a rock asphalt plant at this location. Those interested include: H. A. Keith, president; N. B. Rogers, executive vice-president; H. A. McLean, production manager, and C. E. Keller, quarry foreman.

Sell Gravel Concern

BROWN SAND AND GRAVEL Co., Pasco, Wash., has been sold to H. E. Mathieson, Sunnyside, Wash., who has been in the contracting business. Mr. Brown will continue to operate his shovel and other equipment on a contract basis.

Big Gravel Contract

GRAVEL PRODUCTS Co., Hughson, Calif., has a contract to supply 45,000 tons of sand and gravel to be used in

paving Route 99 south of Modesto, Calif. Calveras Portland Cement Co. is to supply 45,000 bbl. of cement for this job, according to local reports.

Open Sand Deposits for Ordnance Plant Job

FERGUSON-OMAN Co., contractors have opened three large sand pits near Milan, Tenn., for material used in construction at the Wolf Creek ordnance plant. From the pit now in operation about 3000 cu. yd. of sand are taken daily. The quality of the sand is said to be excellent. R. W. Kirby, superintendent, reports that the quality of sand approximates that of asphalt sand.

Rip-Rap Stone for Navy Breakwater

GUY F. ATKINSON Co. and George Pollock Co., contractors for construction of a new fleet operating base breakwater off Long Beach, Calif., are operating the Ormand granite quarry near Riverside to get out rock to exceed five tons in size.

New Stone Plant

RALPH ROGERS CONSTRUCTION Co., Bloomington, Ind., has built a stone crushing plant of 100 tons hourly capacity near Bedford, Ind., to furnish materials to the Maxon Construction Co., contractors for the Burns City Naval storage depot.

Buy 12,000 Tons of Limestone Dust

CONCHO ROCK AND GRAVEL Co., Oklahoma City, Okla., has received an order for 12,000 tons of limestone dust from the Oklahoma soil conservation officials. Lewis Doughty, superintendent of the Pawhuska plant, announced that crushing operations would be started immediately on this order, but much of it will be taken from existing stockpiles accumulated as a by-product of other crushing operations.

Moving Gravel Plant

THE GEORGE W. RAYNER CORPORATION, Niagara Falls, N. Y., is planning to move its machinery and equipment to Limestone, Penn., to work a white gravel deposit in the Nichols Run Valley. The corporation has taken over approximately 20 acres of land.

To Dredge Sand

BUTLER SAND AND GRAVEL Co., Jacksonville, Fla., has asked for a permit to dredge sand for commercial purposes in the Satilla river between Burnt Fort, Ga., and Atkinson, Ga. It is planned to use a 6-in. dredge pump.

Opening Mica Deposit

A. R. LAMBERT is opening a mica deposit near Talking Rock, Ga., under lease. This is the first activity in the Georgia mica industry in years.



Evans, Wash., lime plant of U. S. Gypsum Corp., having an annual capacity of 21,000 tons hydrated lime

Building Lightweight Aggregate Plant

WASHINGTON HAYDITE & CONCRETE PRODUCTS Co., Seattle, Wash., recently started the construction of a new plant to make Haydite, a lightweight burned clay aggregate used in making concrete products. Officers of the company are: Jay L. Warner, Seattle, president; E. L. Warner, Tacoma, vice-president; D. C. Knapp, Seattle, secretary; Bert E. Harrison, Tacoma, treasurer.

Arrest German Cement Inventor

FREDERICK FINKELDEY, who claims to have been the inventor of the sea-waterproof cement used in the construction of the San Francisco Bay Bridge, pleaded guilty to charges of illegally entering the country from Mexico and received a sentence of one year in jail and a fine of \$1000.

Expansion

THE WARNER CO., Philadelphia, Penn., reports the installation of a new 3-cu. yd. Ransome mixer at the Wilmington plant. Two International Model D-246-F trucks with four rear-wheel drives and inter-axle differentials were also placed in service at this plant, one of the units being equipped with a 7-cu. yd. dump truck body for bulk material handling, and the other mounting a 1935 Jaeger mixer body.

Lease Gravel Lands

READING SAND & GRAVEL CO., Reading, Ohio, has leased 20 acres at Granite avenue and Clark road, Cincinnati, Ohio, and has a plant in operation, processing 800 tons of sand and gravel daily.

Denied Permit

ACME SAND AND GRAVEL CO., Spokane, Wash., has been denied its appeal for a permit to put in bins for a concrete batching plant at the Hawkeye gravel pit.

Erratum

IN THE JANUARY ISSUE of ROCK PRODUCTS, page 134, it was stated that Washington-Idaho Lime Products Co., Orofino, Idaho is installing a Western Precipitation Corp. Cottrell electrical precipitator to recover stack dust. The report should have been that a Multiclone dust collector is being installed.

Quarry Changes Hands

FRED GRUETZMACHER has purchased from Fred Drephal the stone quarry in Cicero, Wis. The transfer of ownership was made in July.

WHY PLAT-O SCREENS! SIZE BETTER!

DEMAND THESE 8 FEATURES:

1. Opposed Elliptical Throw—Low Headroom—Accurate Grading—High Capacity.
2. Adjustable Throw.
3. Powerful Positive High Speed.
4. Oil—Not Grease.
5. Automatic Screen Cloth Tension—each deck independently changed.
6. Vibration Fully Cushioned.
7. Only Two Bearings.
8. Lowest Power Requirements.

● It's the opposed elliptical throw that does it. When the material starts at "A", the screen is nearly flat, and it is pushed along by the throw alone. As it progresses over the screen (with the smallest fines taken out here), the throw becomes circular, turning the material over and over.

The last third of the screen is definitely down-hill—here the very large oversize shoots off, while the near-size is thrown back, turned, twisted, until the accuracy known only to PLAT-O screens is obtained. Write for new bulletin No. 27.

DEISTER MACHINE CO., Fort Wayne, Indiana




WEIGH WHILE YOU CONVEY

with a
Weightometer



For over 30 years the Cement and Allied Industries have used Merrick equipment for weighing, feeding and proportioning. Many original installations are still in daily service. Successful operators continue to specify Merrick equipment, time-tried and proved and built for today's needs.

Send for Bulletin No. 375.

MERRICK SCALE MFG. CO.
108 AUTUMN ST. PASSAIC, N. J.

THE ROSS FEEDER

Completely controls the flow of any size material from Storage Bins, Hoppers or Open-Dump Chutes to Crushers, Conveyors, Screens, etc.

High in efficiency. Low in maintenance and power consumption.

Furnished in sizes to suit your operation. Send full particulars for recommendation.

ROSS SCREEN & FEEDER CO.

19 Rector Street
NEW YORK, U. S. A.

2 Victoria Street
LONDON, S. W. 1, ENGLAND



Traffic and Transportation

PROPOSED RATE CHANGES—The following are the latest proposed changes in freight rates up to and including the week of April 12:

Central

66189 (2) Lime, common, hydrated, or slaked, in bags, barrels, casks, iron drums or in bulk, C. L. Establish on, to Hometown, Ind., from Quincy, Ill., Hannibal, Mo., Moshier and Ste. Genevieve, Mo., 20c, min. wt. 30,000 lb.; 16c, min. wt. 50,000 lb.

66207. Roofing granules (silica), C. L., min. wt. 60,000 lb. Established on, from Brittain and Copley, O., to Northfield, Ill., 314c per net ton.

66230. Sand, all kinds, and gravel, in open top cars, C. L. Established on, from South Lebanon, O., to Wilmington, O., 44c per net ton, to expire June 20, 1941.

66249. Slag, expanded, C. L. Establish on, from Chicago, Ill., to Paterson, N. J., 387c net ton.

66255. Sand as described in Item 200 under commodity descriptions A, B and C, per C. F. A. L. Trf. 573-A. Establish on, from Coalton, O., group to Narrows, Va., A. 230c, B. 242c and C. 204c per net ton.

66256. Crushed stone, in bulk, in open top cars only; crushed stone screenings, in bulk, in open top cars only; tallings, in bulk, in open top cars only, C. L. Establish on, from Nario, O., to Ferguson, Ind., 110c per net ton, to expire Dec. 20, 1941.

66257. Stone, crushed (in bulk), and crushed stone screenings (in bulk), in open top cars, C. L. (See note 3.) Establish on, from Spore, O., to Osborn, O., 116c per net ton, via N. Y. C. (W), Edison or Martel, O., N. Y. C. (C).

65506 (1). Sand and gravel, in straight or mixed C. L., (see Note 3), (subject to Note 30, page 22 of P. M. Ry. Trf. 6206-Q). Establish on, from Lamar-Wyoming and Ferrysburg, Mich., to Kingsbury, Ind., 134c per net ton. When shipments are not weighed upon track scales, the estimated weight will be 2700 lb. per cu. yd. on sand, and 3000 lb. per cu. yd. on gravel, and 3000 lb. per cu. yd. on mixed C. L. of sand and gravel.

66007. Dolomite, roasted (refractory dolomite, in granular form, treated or untreated, clinkered or burned to a dead state), C. L. (see Note 3). Establish on, from Durbin, O., to Glen Ferris, W. Va., 214c per net ton.

66016. Limestone, ground or pulverized, unburnt, C. L., min. wt. 60,000 lb. Establish on (rates in cents per net ton), to Albany, N. Y. (referred to as "A") and to Boston, Mass. ("B"). From Marlo, Mo., A 566, B 644; Mosher, Mo., A 566, B 644; Ste. Genevieve, Mo., A 566, B 644; Quincy, Mo., A 578; Hannibal, Mo., A 578; Marblehead, Mo., A 578. Above rates to be made subject to Item 5, CPAL Tariff 218-M (general application of rates to eastern basing points and points taking same rates, as per CPAL Basing Tariff No. 470-A).

66049. Sand and gravel, in open top cars, C. L. Establish on, from Navarre, O., to North Lima, O., 99c per net ton, via W. & L. E.-Canton, O.-P. R.R.-Columbiana, O.-Y. & S.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Note 4—Reason: No present or prospective movement.

Note 5—Reason: Comparable with rates from other origins in immediate vicinity.

Note 6—Rates will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in box cars are to be assessed.

Note 7—The oil, tar or asphaltum not to exceed 10% of weight of the commodity shipped, the shipper to so certify on shipping order or bill of lading.

66050. Industrial sand, as per usual descriptions (a), (b) and (c). Establish on, from M. & S. Valleys Group pts., viz.: Geauga Lake, Mahoning, Phalanx, Burnetta, Ohlton, O., Edenburg, Volant, Schollard, Leesburg, Greenville, Osgood and Henlein, Pa., to Glen Morgan, W. Va., (a) 319c; (b) 351c; (c) 319c per net ton.

66141. Sand (except industrial) and gravel, in open top cars, C. Y. Establish on, from Wolcottville, Ind., to Ferguson, Ind., 94c per net ton, via P. R. R., Ft. Wayne, Ind., N. Y. C. & St. L. R. R.

66144. Sand (except industrial), C. L. Establish on, from Chicago, Ill., to Indianapolis, Ind., 200c in closed equipment and 180c per net ton in open equipment. Note—Open car rates will not apply on shipments in cars with tarpaulin or protective covering. In such circumstances, the rate applicable in closed equipment is to be assessed.

66169. Blocks, building, cement or concrete (not reinforced with metal), (solid, hollow or perforated), except enameled, individual blocks, not being packed, C. L., min. wt. 60,000 lb., Rule 24 of Off. Classen, not to apply. Establish on, from Indianapolis, Ind., to Charlestown, Ind., and Cincinnati, O., 209c per net ton.

66190. Sand (except industrial) and gravel, in open top cars, C. L. Establish on, from Winona Lake, Ind., to Ferguson, Ind., 70c per net ton, to expire with June 20, 1941.

66313. Sand (except industrial); sand, (except industrial) in open top equipment, C. L. (see Note 6). Establish on, from Black Siding, Mich., to Salem and Minster, O., 264c per net ton in open and closed cars; from Vassar group, viz.: Vassar, Juniata, McHale, Wampson and Watrous, Mich., to Minster, O., 220c in open cars and 231c per net ton in closed cars.

66320. Sand (except industrial); sand, (except industrial), in open top equipment, C. L. (see Note 6). Establish on, to Morris, Ill., from Vassar Group, viz.: Vassar, Juniata, McHale, Wampson and Watrous, Mich., 264c per net ton in open and closed cars.

66326. Silica, C. L., min. wt. 60,000 lb. Establish on, from Cox and Elco, Ill., to pts. in Official terry., rates on basis of 15% of 1st class rate.

66348 (2). Sand (except industrial) and gravel, in open top cars, C. L. Establish on, from Attica, Ind., to Kingsbury (Dillon), Ind., 99c per net ton, via Wab. Ry., Peru, Ind., Winona R. R., New Paris, Ind., and Wab. Ry.

66368. Limestone, ground or pulverized, C. L., min. wt. 60,000 lb. Establish on, from Louisville, Ky., to Charleston, Ind., 77c per net ton, via B. & O. R. R. direct.

66410. Sand, gravel and crushed stone, C. L. Establish on, to Liverpool and Hartsdale, Ind., from Zone 2 points, 55c and



INDUSTRIAL BROWNHOIST BUCKETS

STEP-UP PRODUCTION . HELP CUT HANDLING COSTS

Built in rope-reeve, power-wheel, lever-arm and link types, there is an Industrial Brownhoist clamshell bucket designed to best meet your specific handling needs. Durable, strong and easy to operate. Note how the rope-reeve bucket illustrated takes a full bite in the handling of red clay. Capacities from 1/2 to 15 yds. Write for catalog 353.

INDUSTRIAL BROWNHOIST

DAY CITY, MICHIGAN • DISTRICT OFFICES: NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, CHICAGO

Uniform Separation

The new model GAYCO Centrifugal air separator makes possible the uniform and increased recovery of cement and other extremely fine materials within a range of 60 to 400 mesh.

- Greater Capacity
- Cleaner Tailings
- 99% Through 325 Mesh
- 25% to 30% greater recovery of fines.
- Not affected by variation in speed or rate of feed.



Manufacturers also of "Reliance" Crushers, Screens, Elevators, Conveyors, Bin Gates, Grizzlies. Complete crushing, screening and washing plants for crushed stone, sand and gravel.

UNIVERSAL ROAD MACH'Y CO.

Rubert M. Gay Division 117 Liberty St. New York, N. Y.
Canadian Representative: F. H. Hopkins & Co., Ltd., Montreal

"COAT with COAST"



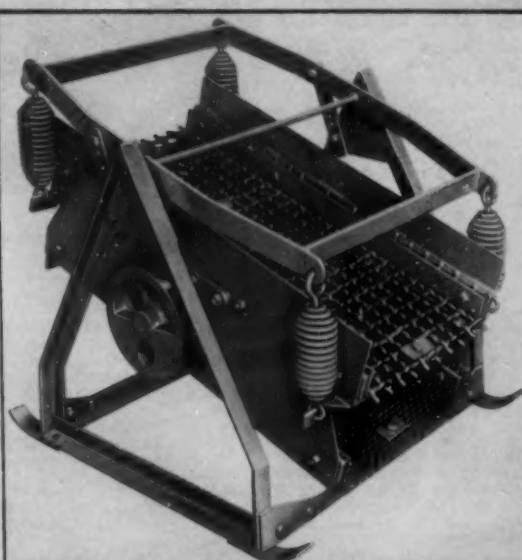
A BUILD-UP TO LONGER LIFE

Progressive stages in rebuilding worn digger teeth preparatory to hard surfacing with Coast Metals are shown above. These manganese steel teeth were first built up with manganese applicator bars and then protected with an overlay of Coast Metal No. 112. The result—the completely rebuilt tooth—is shown at the right.

A coating of Coast Metal increases the normal life of teeth several times by resisting abrasion and retarding wear. This is a typical example of the economy obtained by using Coast Metals where severe abrasion is encountered. It is one of the many ways Coast Metal will make your machinery last longer and work better.

Write today for complete information.

COAST METALS, INC. CANTON, OHIO



THIS PORTABLE VIBRATING SCREEN

ACCURATELY SEPARATES 100 TONS OF MATERIAL PER DAY INTO 3 PRODUCTS
USES ONLY A 1 H.P. ELECTRIC MOTOR OR 2 H.P. GAS ENGINE

Send for Bulletin No. 110

ROBINS CONVEYING BELT COMPANY
PASSAIC, NEW JERSEY

FINISH THE JOB WITH A BAUGHMAN LIMESTONE SPREADER



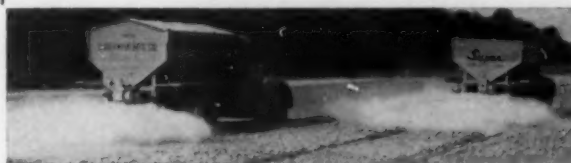
Be sure that your production of agricultural limestone is correctly applied.

Baughman spreaders will do it. Even distribution of limestone up to 40 ft. width is assured by the spreading action of a specially-designed revolving disc.

The illustration below shows two 7½ ton Baughman MAMMOTH limestone spreaders at work. Notice how the spread is held down to the ground where it belongs and also the width of the spreads. These two machines have spread thousands of tons of lime and are still going strong.

Baughman limestone spreaders are made in models that can be attached to flat or dump trucks. The new, improved MAMMOTH carrier and spreader comes in seven models ranging from 6 to 18 tons. Each model is a self-contained unit with built-in drives and controls.

Write for our literature



BAUGHMAN MANUFACTURING CO.
Specializing in Spreading Equipment
JERSEYVILLE, ILLINOIS

Zone 3 points, 60c per net ton. (For single line application, the joint line rates to be 20c per net ton higher, respectively.)

66451. Slag, expanded, C. L. Establish on, from Chicago, Ill., to Allentown, Penn., 366c per net ton.

66512. Limestone, agricultural, unburnt, and screenings, agricultural limestone, in bulk, in open top cars, C. L. Establish on, from Spore, O., to Charlestown, O., 127c per net ton, via N. Y. C. (W.), Fostoria, O., B. & O. R. R.

66516. Sand (except industrial) and gravel in open cars, C. L. Establish on, from Elkhart, Ind., to Fort Wayne, Ind., 55c per net ton, via N. Y. C. (W) direct.

66518. (a) — Lime, common, fluxing, hydrated, quick or slaked, C. L., min. wt. 30,000 lb.; (b) C. L., min. wt. 50,000 lb. Establish on, from Lewisburg, O., to Arcanum, Brookville, Carlisle, Carlisle Jct., D. & U. Crossing, Greenville, New Paris, Savona, Trotwood and West Manchester, O., (a) 9c and (b) 7c.

66519. Lime, common, hydrated, quick or slaked, in bulk in packages, C. L., min. wt. 30,000 and 50,000 lb. Establish on, from Lewisburg, O., to pts. in Ky., rates as follows: ("a" refers to min. wt. at 30,000 lb. and "b" to min. wt. of 50,000 lb.) (Rates in cents per net ton) from Lewisburg, Ohio, to Anchor, (a) 374, (b) 292; Bowling Green, (a) 374, (b) 299; Cadiz, (a) 418, (b) 334; Central City, (a) 374, (b) 299; Corydon, (a) 374, (b) 299; Elktown, (a) 407, (b) 326; Fordsville, (a) 352, (b) 282; Fulton, (a) 451, (b) 361; Glasgow, (a) 363, (b) 290; Hazard, (a) 374, (b) 299; Hickman, (a) 462, (b) 370; Hopkinsville, (a) 407, (b) 326; Jackson, (a) 341, (b) 273; Lawrenceburg, (a) 308, (b) 246; Lebanon, (a) 330, (b) 264; Lexington, (a) 297, (b) 238; Lot, (a) 374, (b) 299; Madisonville, (a) 385, (b) 308; Middlesboro, (a) 374, (b) 299; Mt. Vernon, (a) 341, (b) 273; Owensboro, (a) 374, (b) 299; Providence, (a) 396, (b) 317; Richmond, (a) 319, (b) 255; Spottsville, (a) 374, (b) 299; Sturgis, (a) 385, (b) 308; West Point, (a) 319, (b) 255; Whitesburg, (a) 396, (b) 317; Wickliffe, (a) 429, (b) 343; Williamsburg, (a) 363, (b) 290; Williamstown, (a) 275, (b) 220; Winchester, (a) 308, (b) 246; Worthville, (a) 286, (b) 229.

66369. Limestone, C. L., min. wt. 60,000 lbs. Establish on, from Beachville, Ont., to Mansfield, O., 30c, via routes as specified in C. N. Rys. Routing Guide No. G. 10.

66524. Limestone, ground or pulverized (unburnt), C. L., min. wt. 60,000 lb. Cancel rate of 396c per net ton on, from Painesville and Perry, O., to Brantford, Hamilton and Toronto, Ont., published in Item 250 of N. Y. C. & St. L. R. R. Trf. 835-E. Classen. basis to apply in lieu thereof.

66552 (cancels WDA 65456). Lime, common, hydrated, quick or slaked, C. L., in bags, barrels, casks, iron drums, or in bulk, as per description in CFA., Trf. 516-E. Establish on, to Alloy, W. Va. (1) refers to 30,000 lb. min. wt. and (2) to 50,000 lb. min. wt. From Mosher, Mo. (1) 24, (2) 19; Ste. Genevieve, Mo. (1) 24, (2) 19; Hannibal, Mo. (1) 25, (2) 20; Quincy, Mo. (1) 25, (2) 20; Northwestern Ohio Group 1 (1) 19, (2) 15; Scioto, O. (1) 17, (2) 13; West Columbus, O. (1) 16, (2) 13; Marble Cliff, O. (1) 16, (2) 13.

66571. Crushed stone, in bulk, in open top cars, C. L., min. wt. 120,000 lb. Establish on, from Speeds, Ind., to Jeffersonville, Ind., 35c per net ton.

66583. Rock, silica, crushed (not ground or pulverized), in open top cars, C. L. (see Note 3). Establish on, from Henlein, Penn., to Cleveland, O., 105; Farrell, Penn., 88; Farrell, Penn., 77; Midland, Penn., 121; Niles, O., 88; Sharon, Penn., 88; Sharon, Penn., 77; Steubenville, O., 121; Struthers, O., 88; Warren, O., 88; Weirton, W. Va., 143.

Trunk

39645. Crushed stone and screenings, in straight or mixed C. L. (will not include agricultural limestone or ground limestone, unburnt; fluxing stone or firestone; or stone coated with oil, tar or asphaltum), (see Note 3), from Monocacy, Penn., to Glasgow, Va., \$2.86 per net ton, in lieu of current 6th class rate of 28c per 100 pounds. (See Note 5.)

39659. (A) Sand (other than industrial) and gravel, in open top cars, without tarpaulin or other protective covering; sand and gravel (other than industrial) in closed cars or in open top cars with tarpaulin or other protective covering, C. L. and sand, naturally bonded moulding, in open top or closed cars. (B) Sand, industrial, C. L. (see Note 3), to Marelau, Que., from Cedar Lake, Cedarville, Dividing Creek, Farmingdale, Greenwich, Hayville, Lakewood, Newport, Pinewald, Quail Run, Sheppard's Mills, South Lakewood, Toms River, Whitings, Winslow Jct., N. J., (A) \$5.19 and (B) \$5.71 per net ton in lieu of current class rates. (See Note 5.)

39708 (shippers). Ganister rock, not ground, C. L. (See Note 3) from Hancock, Berkeley Springs, W. Va., Mt. Union, Harbison Walker No. 16, Moores Mills, Barre, Wolfsburg, Madley and Port Matilda, Penn., to Alloy, W. Va., \$2.75 per net ton. (See Note 5.)

39682. Fluxing lime, having no commercial value for chemical or building purposes, C. L., min. wt. 60,000 lb., from Karo, Va., to Pittsburgh, Penn., \$2.20 per net ton in lieu of current rate of \$2.50 per net ton (see Note 5).

39697. Limestone, viz.: Crude, fluxing, foundry and furnace, when loaded in bulk in open top equipment, C. L. (see note 3), from Limeton, Va., to Monessen, Penn., \$1.51 per gross ton in lieu of current 6th class rate of 25c per 100 lb. (see Note 5).

39722. Sand (other than ground or pulverized or naturally bonded moulding) in open top cars without tarpaulin or other protective covering, C. L. (see Note 3), from Brooklyn Eastern District Terminal, Brooklyn, N. Y., to Syracuse and Solvay, N. Y., \$2.97 per net ton in lieu of current 6th class rate. (See Note 5.)

Southern

25132. Phosphate Rock, C. L. Establish 570c gross ton, Florida mines to Florence and Sheffield, Ala.

25158. Stone, rip rap, C. L. Establish 115c net ton, Cedar Bluff and Charline, Ky., to Wicker, Miss. Water competitive. Expires 12/21/41.

25180. Lime, common, hydrated, quick or slack, and dry bldg. mortar, C. L., min. 50,000 lb. Est. 64c cwt., River Front Extension and South Knoxville Extension, Tenn., to Knoxville, Tenn.

25303. Phosphorus, yellow, C. L. Establish 115c cwt., Nichols, Fla., to Malden, Miss.

25343. Mica, dry ground, and mica schist, dry ground or screened, C. L. Min. wt. 60,000 lb. Establish 29c cwt. Johnson City, Tenn., and Clinchfield R. R. producing points in N. C. to Memphis, Tenn., E. St. Louis, Ill., St. Louis, Mo., and Belleville, Ill.

25360. Soapstone or talc, C. L. Cancel, as obsolete, rate of 237c net ton from Hemp, N. C., to Norfolk and Newport News, Va., published in Item 4630, S. F. T. B. Tariff 724-C.

25378. Phosphate rock, crude, lump or crude ground, and limestone, phosphatic, C. L. Establish 432c net ton. Mt. Pleasant-Centreville, Tenn. District to Lehigh Spur, Ind.

Southwestern

23767. Phosphate rock, Florida to Shreveport, La., and Barksdale Field, La. Establish rate of 625c per ton 2,240 lb. on crude phosphate rock, C. L., from origins named in Item 2301 of S. W. L. Tariff 114-I, Agent J. R. Peel's I. C. C. 3203, to Shreveport, La. It is also proposed to cancel present rate on phosphate rock from Florida mines to Barksdale Field, La., because that point is within switching limits of Shreveport, La.

23604. Roasted dolomite. Establish rate of \$2.75 per ton of 2,000 lb. on C. L.; min. wt. 80,000 lb., from Dolly Siding, Mo., to Kansas City, Mo.

23824. Limestone, ground. Establish rates on (see Note 3), from Lampasas, Tex., to Denver, Colo., 460; Colorado Springs, Colo., 424; Pueblo, Colo., 411. Rates are in cents per ton of 2,000 lb.

New England

53679 (1-R). Feldspar, crude, in packages or bulk, min. wt. 60,000 lb., Madawaska, Ont., to Bates, Me., and Keene, N. H. Present, 35 (90 per cent of 6th class as per Agent Mathews' I. C. C. 119 and 120); proposed, 19.

Industrial Sand Rates in Pennsylvania

THE I. C. C. in No. 28150 has declared intrastate rates on industrial sand in open top cars from Polk and Utica, Penn., to destinations in western Pennsylvania to be unjustly discriminatory against interstate commerce. The Commission held these rates for distances of 200 miles and less were not contributing a fair and just proportion to the revenues of the respondents. As a result, it declared, the railroads were suffering substantial losses in revenue to which they were entitled and an increase in rates on the intrastate traffic to the bases prescribed would not be above a reasonable level.

Cement to China

SAMPLES of low-heat cement which was manufactured for construction of the Grand Coulee dam have been sent to Dean H. Pollet of the faculty of engineering, Tientsin University, Tientsin, China, by the Lehigh Portland Cement Co., Metairie Falls, Wash., plant. It was necessary to hermetically seal the samples and to label them so the Japanese would not seize them. The samples will be used in connection with building exhibits.

Magnesite Anti-Trust Case

HARBISON-WALKER Refractories Co., General Refractories Co., three other corporations and seven individuals have pleaded not guilty in federal court to an indictment alleging conspiracy to restrain production and importation, and to control prices of magnesite brick and dead burned magnesite.

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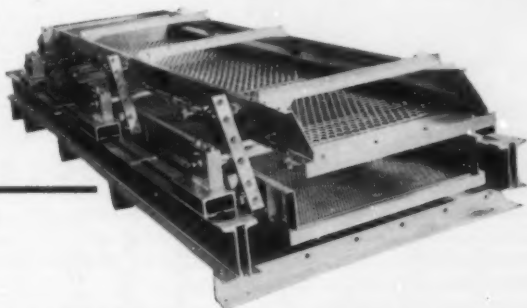
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558 W. 54th St. NEW YORK 625 W. Jackson Blvd. CHICAGO 308 Midco Building TULSA 3155 Seneca St. BUFFALO 123 W. Philadelphia St. WHITTIER, CALIF.

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• **FLEXCO H D RIP PLATES** are used in repairing rips and patching conveyor belts. The wide space between outer bolts gives the fastener a long grip on the edges of the rip, while the center bolt prevents the fasteners from bulging.



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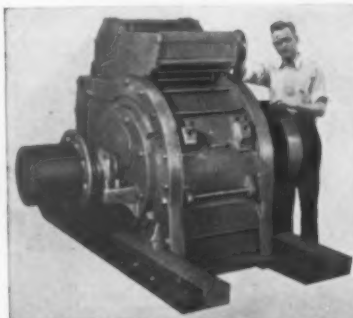
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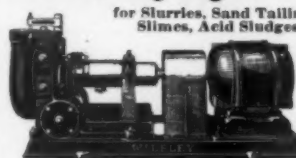
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WRITE FOR NEW CATALOG NO. 55

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OBITUARIES

JOHN A. ROONEY, president of Eastern Quarries and the Pilgrim Granite Corp., West Roxbury, Mass., died recently at the age of 75. He was formerly building commissioner of Boston, Mass.

GEORGE L. KICE, sales representative of the Oklahoma Portland Cement Co., Ada, Okla., died March 21. At one time he was secretary and sales manager of the company.

LAWRENCE E. CRASWELL, head of the Portland Sand and Gravel Co., Portland, Ore., died recently.

AUGUST STEFFEN, retired quarry operator, died April 2 at his home in St. Louis County, Mo.

FRANK C. VAN ETTEN, who has been associated for over 20 years with the sand and gravel department of H. D. Conkey & Co., Mendota, Ill., as vice-president, died on April 14.

PRICES BID

Contracts Let

FT. WAYNE, IND.: Allen county commissioners awarded J. C. O'Connor & Sons Co. a contract for 5000 cu. yd. of sand at 65c a cu. yd.

ELYRIA, OHIO: The city board of control awarded Lock Joint Pipe Co. contract for 630 ft. of 36-in. reinforced concrete pipe at \$2.57 a ft.

ST. CHARLES, MO.: St. Charles Quarry was awarded a contract for 1000 tons of limestone macadam at \$1.13 a ton; James C. Traville, 750 tons of trap rock at \$2.50 and \$2.75 a ton; and B. M. Worful, 500 tons of sand at 85c a ton less 2 percent.

NASHVILLE, TENN.: Volunteer Portland Cement Co., Knoxville, Tenn., has been awarded a contract by the Tennessee purchasing department for 4000 bbl. of cement to be used in constructing an apron at the Knoxville airport. The price was \$2.48 per bbl.

NORFOLK, VA.: The City of Norfolk recently placed an order for 225 tons of hydrated lime with Whitehurst-Wilbur Co., Inc., at \$10.74 per ton delivered at Dennys, Va., and \$10.64

per ton delivered at the 37th St. siding, Norfolk. The lime will be used by the water supply division.

SPOKANE, WASH.: The Spokane Portland Cement Co. has been awarded a \$228,000 contract for approximately 100,000 bbl. of cement by the procurement division of the Federal Works Administration. The cement is to be used for work on the Sunset airport.

APPLETON, WIS.: Ready-mixed concrete will be bought as it is needed for the municipal pool from the Schabo and Son Co. and the Valley Ready-Mixed Concrete Co. at \$6 per cu. yd. An additional 30c per yd. will be paid for water proofing and 50c for heating the concrete if necessary.

SULPHUR, OKLA.: Southern Rock Asphalt Co. has received an order for 9000 tons of rock asphalt at about \$7.22 per ton to be shipped to Alexandria, La. The material will be used on a road and a landing field in Kisatchie National Forest.

TULSA, OKLA.: Dewey Portland Cement Co., Dewey, has been awarded a contract by U. S. engineers to furnish cement for construction of the Fort Supply dam in western Oklahoma. The contract price is \$154,200.

STOUGHTON, WIS.: Edgerton Sand and Gravel Co. has been awarded a contract for approximately 900 tons of sand at 88c per ton and 1300 tons of gravel at 98c per ton, to be used in the construction of a combined high school gymnasium, guard armory and community building.

MT. GILEAD, OHIO: Chesterville Gravel Co. has received a contract for 4000 cu. yd. of gravel from the Morrow county board at a price of 45c per cu. yd.

MOUNDSVILLE, W. VA.: Crystal Sand Co. will deliver sand for a road building project at a cost of \$1.40 a ton.

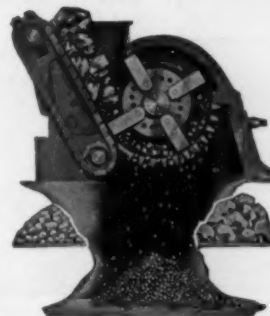
Fire Destroys Plant

ACKER CEMENT PRODUCTS & SUPPLY Co., Fort Wayne, Ind., had a fire which practically destroyed its plant. The loss is estimated in excess of \$10,000.

Buy Block Factory

A. E. McOMBER and his son, Edward, recently purchased a concrete block plant formerly owned by Clyde Probst of Dowagiac. A new building will be constructed near a gravel pit

A New High Degree of Crushing Efficiency



More production — more profit — lower operating and maintenance costs. All these are features of DIXIE performance.

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17 John St., New York, N. Y.

New Incorporations

Castellucci & Sons, Inc., Providence, R. I., has been granted a charter with authorized stock of 350 shares no par value. Incorporators are Samuel A. Castellucci, 138 Messer St., Ernest Castellucci, 724 Admiral Street and Joseph Castellucci, 605 Branch Avenue.

Dunn Limestone Co., Inc., Spencer, Ind., has been granted a charter. Capital is 1000 shares no par value and incorporators are John D. Beem, Felix A. Dunn and Watson Buker. Agent is John D. Beem, 354 N. Washington St., Spencer.

Fairfield Washed Sand & Gravel Co., Inc., Bridgeport, Conn., has been granted a charter. Incorporators are Louis Angenola, Herbert A. Pelton and Harry Kursman.

Franklin Asphalt Co., with principal office at 901 Market St., Wilmington, Del., has been incorporated by J. Rankin Davis, Opal B. Clayton and L. M. Titter. Capital is \$25,000 in 1600 shares no par value.

Henderson Concrete Co., Henderson, Ky., has been incorporated by Edward N. Frisse, J. H. Rudolph, J. H. Traub, Nina A. Wilson, W. R. Humber, Frances S. Clore and Brendan P. Humber. It is capitalized at \$40,000.

Hoosier Crushed Stone Co., Inc., sixth and Water Streets, New Albany, Ind., has been incorporated with a capital of 100 shares no par value. Incorporators are Morris M. Best, R. Rea Eckert and Byron J. Moore.

Kenosha Sand and Gravel Co., Kenosha, Wis., has been incorporated by A. E. Bounsall, John Herzog and J. B. Mobinaro. Capital is 500 shares at \$50 each.

Mississippi Concrete Pipe Corp., Tallahassee, Fla., has been incorporated with a capital stock of \$30,000.

Manufacturers' News Notes

Iron & Steel Products, Inc., Chicago, has opened a branch office in Washington, D. C., in the American Security Building. Ernest W. Smoot, vice-president, in charge.

Marmon-Herrington Co., Inc., Indianapolis, Ind., announces the appointment of Seth Klein as assistant to the vice president. Mr. Klein is well-known in the automobile industry and has been associated with it since 1912.

Stulz Sickles Co., Newark, N. J., has announced the following distributors: Baum Iron Co., Omaha, Neb.; James C. Dawes Co., Martins Ferry, Ohio; Faeth Co., Kansas City, Mo.; Kacena Co., Cedar Rapids, Ia.; New York Welding Supply Co., New York City; Sioux City Iron Co., Sioux City, Ia.; and Velde, Roelfs & Co., Pekin, Ill.

Raybestos-Manhattan, Inc., Passaic, N. J., reports that William H. Dunn, secretary, comptroller, and director, has been elected treasurer of the Rubber Manufacturers Association.

Chain Belt Co., Milwaukee, Wis., has announced the appointment of Johnston Equipment Corporation, Sioux City, Iowa, as distributor of Rex equipment in the Sioux City territory.

Marion Steam Shovel Co., Marion, Ohio, has made several changes in official personnel. Joseph O. Reed has been made district manager for the Pacific Northwest with headquarters in Portland, Ore.

Kenneth H. Winter has been transferred from the New England territory to St. Louis, Mo., with offices in the Kinloch building.

Centrifugal & Mechanical Industries, Inc., New York, N. Y., has announced that Francis E. Finch, formerly president of Ruggles-Coles Engineering Co., and later vice-president of the Harding Co., is now associated with the company.

Link-Belt Co., Chicago, Ill., has announced the election of Ralph M. Hoffman as vice-president. Mr. Hoffman has been delegated the general direction and supervision of sales for the company. He has been assistant to President Kauffmann since January, 1940.



Ralph M. Hoffman

Coming to the Link-Belt subsidiary organization in 1923 as manager of the Seattle branch, he served in this capacity until 1931 when it was made the Pacific Division. He was then made vice-president and sales manager of this division with headquarters at San Francisco. At one time he was associated with the Superior Portland Cement Co., as a draftsman. Harry L. Strube has been appointed chief engineer of the eastern division, succeeding F. F. Waechter, resigned.

Pangborn Corp., Hagerstown, Md., has announced the death of William T. Randall, Philadelphia sales engineer of the company.

Cincinnati Rubber Manufacturing Co., Cincinnati, Ohio, has appointed John Flocker & Co., Pittsburgh, Penn., as distributor of the complete line of industrial rubber products in the Pittsburgh territory.

Robins Conveying Belt Co., Passaic, N. J., has appointed Andrew Hutton as works manager of the Passaic plant. Mr. Hutton is in charge of all manufacturing operations, buildings and equipment.

Pioneer Engineering Works, Minneapolis, Minn., has appointed Carl R. Rolf as assistant sales manager. Mr. Rolf has been with the company since 1929, and since 1937 has been district sales manager covering the central states. Orval Ohnstad has succeeded Mr. Rolf.

Hercules Powder Co., Wilmington, Del., reports the election of Edward B. Morrow, assistant treasurer, to the office of treasurer and a member of the executive committee. Francis J. Kennerley, comptroller, was also elected assistant treasurer.

Thermoid Co., Trenton, N. J., has announced that R. E. Spencer Geare, M.E., has become associated with the company and will concentrate his activities on the improvement of and sales expansion of v-belts.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has promoted several of its officials. James M. White, formerly of the La Forte, Ind., works, has been made assistant general works manager at Milwaukee. Harlow Bradley has been appointed supervisor of foreign dealers with headquarters in Milwaukee. Frederick C. Bryan, for 30 years general traffic manager, died on April 7.

Chicago Pneumatic Tool Co., New York, N. Y., has engaged the services of James P. Gillies to assist in general sales activities.

A. Leschen & Sons Rope Co., St. Louis, Mo., has recently installed a large, modern machine for making wire rope.

Classified Advertisements

**As Never Before . . . You Save Time — You Save Money
with CONSOLIDATED Used Machinery**

SPECIAL

6—UNUSED No. 900 KELLY FILTERS, Twin Units of 450 sq. ft. each.

GYRATORY CRUSHERS

36" Allis Chalmers Style "N", short shaft; 42" Gates; 20" Kennedy Gearless; 20" Traylor; 20" Allis-Chalmers Superior McCully; 15" Tel-smith; 13" Superior McCully and smaller sizes.

GYRATORY FINISHING CRUSHERS

1'8" and 2'4" Traylor TY; 410-TZ, 4' Traylor; Nos. 19, 25, 27 and 40 Kennedy.

JAW CRUSHERS

30x42" Buchanan Type "C"; 48x42 Traylor Bull-dog; 60x86 Traylor; 48x66 Traylor; 36x24 Farrel; 18x36 Farrel; 24x36 Allis-Chalmers; 8x36 Universal Roll Jaw; 18x30 Allis-Chalmers and smaller sizes.

WHIRLEY CRANE

No. 17 Clyde Whirley with 105' boom, new 1938. Oil fired, enclosed cab. Excellent condition.

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Ball Mills: 3'x5', 5'x10', 6'x6', 6'x8', 6'x12', 8'x12', 10'x12', 12'x12', 14'x12', 16'x12', 18'x12', 20'x12', 24'x12', 30'x12', 36'x12', 42'x12', 48'x12', 54'x12', 60'x12', 72'x12', 84'x12', 96'x12', 108'x12', 120'x12', 132'x12', 144'x12', 156'x12', 168'x12', 180'x12', 192'x12', 204'x12', 216'x12', 228'x12', 240'x12', 252'x12', 264'x12', 276'x12', 288'x12', 300'x12', 312'x12', 324'x12', 336'x12', 348'x12', 360'x12', 372'x12', 384'x12', 396'x12', 408'x12', 420'x12', 432'x12', 444'x12', 456'x12', 468'x12', 480'x12', 492'x12', 504'x12', 516'x12', 528'x12', 540'x12', 552'x12', 564'x12', 576'x12', 588'x12', 600'x12', 612'x12', 624'x12', 636'x12', 648'x12', 660'x12', 672'x12', 684'x12', 696'x12', 708'x12', 720'x12', 732'x12', 744'x12', 756'x12', 768'x12', 780'x12', 792'x12', 804'x12', 816'x12', 828'x12', 840'x12', 852'x12', 864'x12', 876'x12', 888'x12', 900'x12', 912'x12', 924'x12', 936'x12', 948'x12', 960'x12', 972'x12', 984'x12', 996'x12', 1000'x12'.

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15-16-17 PARK ROW
Our Shops at Newark, N. J., cover eight acres.
NEW YORK, N. Y.

COMPLETE PLANT FOR FINE PULVERIZING OF SILICA OR OTHER PRODUCTS. MAIN ITEMS CONSIST OF:
4'x20' Indirect Heat Rotary Dryer
6'x22' Hardinge Mill
8' Gayco Centrifugal Classifier
200 H.P. DeLaVergne Diesel Engine
Belt Conveyors, Bucket Elevators, Steel Storage Tanks, Pumps, Air Compressors, etc.

6'x12' ROD MILLS

Hardinge straight side Rod Mill, Titanite lined, herringbone steel gears, enclosed gear drive unit.

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Allis-Chalmers 5'x10', 3 deck; Stephen-Adams 4'x8', 2 deck; Tyler Hummer 3'x5', 4'x5' 1 and 2 decks; 4'x7' Leaky, two deck; 4'x8' Huron, 1 deck; 3'x4' Jeffrey-Traylor, 2 deck; Symons 4'x10', 4'x12', 5'x10', 2 deck. Also Rotex, Robinson and other makes.

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8'x125', 8'x110', 6'x120', 6'x80'.

RAYMOND PULVERIZERS

2, 3 and 4 roll High Side; Nos. 0000, 00, 1 and 3. Beater type—also Nos. 55, 60, 90 Imp type, also No. 40 Imp with 6' Centrifugal Separator.

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2—Sullivan Type WN-102, two stage, 550' New 1939.
2—Ingersoll Rand 90-CH, two stage, air cooled, electric driven, on skids, 360 CFM, 1939.
1—Ingersoll Rand 315-A Portable.
2—Ingersoll Rand 830 cu. ft. air cooled, electric driven 100 lbs., 1939.
1—Chicago Pneumatic OCE 28x12x14; synchronous motor.

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10' Sturtevant; 8', 10', 12' Gayco; 6' Raymond; also 5' dia. Raymond "Whizzer" for attachment to roller mill.

HARDINGE CONICAL BALL MILLS

3'8", 5'22", 6'x22", 7'x22", 8'x30", 8'x72".

LIME HYDRATOR

Weber type, made by Arnold & Wiegell with No. 1 Raymond Bros. Lime Separator; also Kritzer.

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Ruggier-Coles, double shell; 5'x30', 5'x30', 5'x60', 8'x40', 10'x40', 10'x85', single shell; 4'x30', 5'x30', 6'x40', 6'x30', 6'x80', 8'x40', 8'x80'.

34, 1, 1 1/4 yd. Owen & Williams Buckets
30, 35 HP Gas Hoists
50, 60, 100 HP Elec. Hoists
1 1/4 Nwrest Shovel Attachment
1 1/4 B-Erie 41B Shovel attachment
1 yd. Page Dragline Bucket
1/2, 3/4, 1 1/4 Gas Crawler Cranes

J. T. WALSH

Brisbane Bldg. Buffalo, N. Y.

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Universal Stripper with Conveyor & Mixer.
5", 6", 10" & 12" Pallets, with corners.
Br. Header Att. for Anchor.
4" and 5" for Anchor & Clark Lift truck.
80 Cu. Yd. per hr. Gravel Washing Plant.
2 Vibrating Tables.
1—150 LB. Cap. per hr. Stoker.
100 Steel Racks.

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NEW RAILS—5000 tons—All Sections—All Sizes.
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ACCESSORIES—New—Every Track Accessory carried in stock—Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates.
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Phone, Write or Wire

L. B. FOSTER COMPANY, Inc.
PITTSBURGH NEW YORK CHICAGO

No. 50 Austin Western Portable Crushing and Screening Plant.

36x60" Fairmount Single Roll Crusher.

Austin No. 4 over 2' Symons Cone Crusher.

36x24" 48x60" Traylor, 36x24" Farrel Jaw Crushers.

No. 13 Superior McCully & No. 37 Kennedy Gyratory.

60 HP to 360 HP Fairbanks Morse Diesel Engines.

2—6x12" Ball Mills, Siler Lined, Good.

Shovels, Cranes, Screens, Conveyors, Elevators.

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FOR SALE

1500 & 784 CFM COMP. & AC MOTOR
Gyratory Nos. 12K-8-7-6-5 and 4
Jaw—3x36, 9x36, 15x36, Pulverizers.
500 KW oil eng. set. Many others
Code boilers, 250 HP, to 1200 HP.
A.C. TURBO PLANT—1000 K.W. 2300 V.
Reduction Crushers—MG Sets.
Send us your inquiries
ROSS POWER EQUIP. CO.
Indianapolis, Ind.

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.
Fort Wayne, Indiana

NEW AND USED PIPE FOR EVERY PURPOSE

Large stocks carried everywhere for spot shipment

Jos. Greenspon's Son Pipe Corp.
National Stock Yds. (St. Clair Co.) Ill.

FOR SALE

One No. 19 Kennedy gearless ballbearing crusher with 30 hp. wall mounted General Electric motor and drive. All worn parts have been renewed and is in like new condition. This crusher was taken out to make room for a much larger machine.
RADFORD LIMESTONE COMPANY, INC.
RADFORD, VIRGINIA

FOR SALE

Clamshell buckets—Blaw-Knox—1/4, 1/2, 3/4 and 1 yd.
Dragline buckets—Page—1 1/4, 1 1/2 and 2 yd.
Shovel—Bucyrus, 50-B, steam, cat mounted, combination.
Locomotive cranes—20-ton and 25-ton, steam.
Boiler—locomotive steel firebox type, approx. 50 H.P., 125 lbs. pressure, code—Removed from Bucyrus dragline.
Shovel dipper—1 yd., full manganese type with bail.
P. A. HENAU
2140 Bank Bldg. Detroit, Michigan

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ON

RUBBER BELTING

TRANSMISSION—CONVEYOR—ELEVATOR

"V" BELTS

FOR

PUMPS—CRUSHERS—PULVERIZERS—ETC.

RUBBER HOSE

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NEW AND HEAVY DUTY

Conveyor and Elevator Belting

Quantity	Width	Ply	Top Cover	Bottom Cover	Type
500 Ft.	48"	8	1/8"	1/16"	Conveyor
505 "	36"	6	1/8"	1/16"	"
856 "	30"	6	1/8"	1/16"	"
520 "	30"	5	1/8"	1/16"	"
180 "	24"	6	1/16"	1/16"	Elevator
2305 "	24"	5	1/8"	1/32"	Conveyor
1298 "	24"	4	1/8"	1/32"	"
250 "	22"	8	1/16"	1/16"	Elevator
1874 "	20"	5	1/8"	1/32"	Conveyor
520 "	20"	4	1/8"	1/32"	"
506 "	18"	6	1/16"	1/16"	Elevator
1765 "	18"	4	1/8"	1/32"	Conveyor
285 "	16"	6	1/16"	1/16"	Elevator
1450 "	16"	4	1/8"	1/32"	Conveyor
516 "	14"	6	1/16"	1/16"	Elevator
509 "	14"	4	1/16"	1/32"	Conveyor
420 "	12"	6	1/16"	1/16"	Elevator
385 "	12"	4	1/16"	1/32"	Conveyor

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TRUCK MIXERS ROAD AND AIRPORT EQUIPMENT

**Immediate
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- 1—3 yard Rex separate engine drive mixer 1934 on dual pneumatic A.C. Mack..... \$2000
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- 5—No. 25 Thor Paving Breakers..... each 95.00
- 2—No. 70 Thor Rock drill..... each 110.00
- 1—Spencer Dust Control 2 gun unit..... 600.00

All in excellent condition

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8" x 8" Road Forms and 9" x 9" Road Forms
Jaeger Lakewood Road Finishers—Type G
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Used Equipment For Sale

This equipment located at plants of Muskogee Gravel Company, Near Muskogee, Oklahoma.

CRANES

- 1—Orton-Steinbrenner, 1 1/2 cubic yard Track Crane, with 50 foot boom. This machine has been converted into a gasoline powered unit by installing a Caterpillar 60 H.P. Motor, chain driven. It is now in operation and will have to be seen perform to appreciate its efficiency. In good mechanical condition.
- 1—1/2 cubic yard, crawler type, 35 foot boom, crane, made by General Excavator Company, in good mechanical condition.
- 1—1/2 cubic yard, crawler type, 35 foot boom, three-quarter swing, Byers Manufacturing Company.

DREDGE PUMPS

- 1—V-Belt driven—5" Morris, heavy duty.
- 1—Belt driven—5" Morris, C. I. Pump.
- 1—Belt driven—5" Centrifugal pump.

DERRICKS

- 1—Fabricated Steel 8117-Leg, 70' Boom.
- 1—Fabricated Steel Guy Derrick, 80' Mast.

HOISTS

- 1—Double Drum Hoist—Steam Power.
- 1—Double Drum Hoist—No Power Unit.

BUCKETS

- 1—3 cubic yard drag line bucket, with carriage.
- 1—1 cubic yard Clamshell.
- 1—1/2 cubic yard Clamshell.

CRUSHER

- 2—6" x 16" Jaw Crushers.

BUCKET ELEVATORS

- 1—70' length of 8". All on belts.
- 1—80' length of 12". Gears and pulleys
- 1—60' length of 15". for each.

SCREENS

- 1—4' x 12' Revolving Screen.
- 1—4' x 8' Shaker Screen.

CUTTER

- 1—Diamond Cutter—Length 30"—For 10" Dredge Boat.
- This is surplus equipment on hand and can be bought worth the money.

Muskogee Gravel Company
331 Commercial National Building
Phone 4085 — Muskogee, Oklahoma

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Ready-mixed concrete batching plant, 5 compts., 1000 yds. aggregates, 750 bbls. cement, automatic weigh batcher, full electric or manual.
225 tons, 4 compt. bin, weigh batcher.
Butler 100 yd. 3 compt. bin, weigh batcher.
2—115 tons Johnson bins, 3 compt.
Steel bin, 75 yds., single compt., sand and gravel.
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200 ton rock storage bin, steel, heavy construction.
Fuller Klynco bulk cement unloader, portable.
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Smith 1 yd. tilting mixer, electric.
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Koehring 27-E paver with boom and bucket.

BUCKETS—STONE SKIPS

- 22—Steel stone skips, 3 to 9 yds.
- 1 1/2 yd. heavy duty Blaw Knox digging bucket.
- 1 1/2 yd. heavy duty Blaw Knox, digging, clamshell.
- 1 1/2 yd. Hayward rehandling clamshell.
- 1 yd. Hayward clamshell, rehandling.
- 1 yd. Halse rehandling, clamshell.
- 1 yd. Hayward orange peel, 4 leaf.
- 1 yd. Hayward orange peel, 3 leaf.

SHOVELS—CRANES

- 2—Marion Diesel shovels, 1—1/2 yd. cap. No. 50 Bucyrus Erie steam shovel, 2 yds. cap. No. 50-B Bucyrus Erie electric shovel, 2 yds. Lima 150 1 1/2 yd. gas crane, 70' boom.
- Northwest 1 1/2 yd. gas crane, 60' boom.
- Bucyrus Erie electric tunnel shovel, 1 yd. cap.
- Northwest 1 yd. comb. shovel-crane, gas.
- Brownhoist 10 ton crane, gas, 40 ft. boom.

TRACTORS

- RD-8 Caterpillar, with bulldozer.
- RD-7 Caterpillar, with bulldozer.
- Allis Chalmers Model 35, with bulldozer.
- Caterpillar Model 30, with L.P. bulldozer.

LOCOMOTIVES—CARS

- 2—Vulcan 6 ton, gas, 36" gauge.
- 2—Whitcomb 4 1/2 ton, gas, standard gauge.
- 8—3 yd. V type 36" ga. side dump cars.

CRUSHERS—PLANT

- Gyratory crushers: K.V.S. 30, 27-6, 40; Telamith 32, 2A, 3B; Traylor 8"; McCully 13", 8", 6".
- Jaw: 6"x13, 9"x16, 10"x20, 12"x26, 12"x30, 15"x30, 16"x32, 36"x48, 48"x60.
- Complete portable rock crushing plant, nearly new, with crusher, elevator, screen, etc.

RICHARD P. WALSH CO.

30 CHURCH STREET NEW YORK

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Fully Reconditioned

- 4—4'x5' Type 33 Enclosed Hum-mers with or without Generators.
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- 2—5 1/2'x6' Newaygo, Belt Drive—1, 2, or 3 Screen Surfaces.
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- 1—30'x5' Link-Belt—Belt Drive.

Also an Assortment of Trommel Screens

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LOCOMOTIVES SHOVELS — CRANES CARS

- 1—50 ton American Saddle Tank A.S.M.E. Boiler
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 - 1—32 ton Porter Saddle Tank, re-built
 - 15—Modern Covered Hopper Cement Cars
 - 1—17 1/2 ton Brownhoist Steam Loco. Crane, New A.S.M.E. Boiler
 - 1—15 Ton Industrial Steam Loco. Crane, New Tubes, Nat'l Board Boiler
 - 1—1 1/2 Yd. Rehandling Clamshell Bucket, Like New
- Birmingham Rail & Locomotive Co.**
BIRMINGHAM, ALA.

FOR SALE

- KILNS: 8' x 80', 9' x 142', 9' x 160'
 - DRYERS: 5' x 35', 5 1/2' x 32', 4' x 40', 5'6" x 40', 5' x 50'
 - CRUSHING ROLLS: 6' x 5", 24' x 14", 42" x 16"
 - JAW CRUSHERS: 16" x 24", 10" x 36", 48" x 60"
 - BALL MILLS: 5' x 8', 6' x 8', 6' x 22'
 - HARDINGE MILLS: 4 1/2' x 16", 5' x 22", 6' x 22", 9' x 30"
 - RAYMOND MILLS: Nos. 0000, 00, 1, 1 No. 00 Screen Mill. Also 3, 4 and 5 rolls
 - HAMMER MILLS: Williams, Gruendler, J. B., etc.
- We Purchase Single Items to Complete Plants.

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FOR SALE

- 15 TON CABLEWAY — Complete with towers.
- Span—1800 ft.
- Cable—2 3/4 in. by 2375 ft. Condition excellent.
- Carriage—Panama type with load block, etc.
- Full line carriers, buttons and spares.
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4 N. North Carolina Ave.
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- 5 French, 1 Spanish, 1 English Concrete Waterseal Roofing Tile Machines.
- 1 Tile Machine for making Fittings.
- 6000 Steel Pallets, Molds, etc., for fittings.
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Care of Chicago Insulcrete Co.
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- 1—Vulcan Iron Works 7'0" x 55'0" Rotary Dryer in good condition.
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Caledonia, N. Y.

E. C. A. CAN EQUIP YOUR ENTIRE PLANT

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Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

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13—1 150-ton Johnson, 3 comp., 1 150-ton Blaw Knox 2 comp., 1 150-ton Blaw Knox, 4 comp., and the following 2 comp. bins, 2 118-ton Blaw Knox, 1 117-ton Blaw Knox, 1 75-ton Blaw Knox, 1 75-ton Butler, 1 51-ton Blaw Knox, 1 35-ton Blaw Knox, 2 30-ton Johnson. Above with or without weigh batchers.

BUCKETS

26—Clamshell, all sizes and types: Williams, Blaw Knox, and Owen.
6—Draglines: 1—1 1/4 yd. Northwest; 1—1 1/4 yd. Omaha; 1—1 1/4 yd. Page; 2—1 yd. Hayward; 1—1 1/4 yd. Page.
1—1 1/4 yd. Pioneer Cableway Excavator bucket.
7—Drumcraper: 2—1 yd. Sauerman; 1—1 yd. Green; 1—1 1/4 yd. Garst; 2—1 1/4 yd. Garst.

CRANES, DRAGLINES AND SHOVELS

1—Link-Belt K-55, Serial No. 1008, 70' boom, 2-yd. bucket, also have 2 yd. shovel attachment.
1—Link-Belt K-48, Serial No. 1728 with 60' boom, 2 yd.
1—Northwest Model 5, Serial No. 3572 with 50' boom, 1 1/4 yd.; also pull shovel 1 1/4 yd. and

ROCK DRILLS
With any style mounting, wagon, column or tripod.
22—Ingersoll Rand Models X71, Weight 220 lbs. 8-70 wght. 185 lbs. R72 wght. 175 lbs. for 1 1/4" steel.
10—Sullivan Models FG-3, Wght 250 lbs. for 1 1/4" steel. Mod. TJ-10, Wght. 161 lbs. for 1 1/4" steel.
4—Gardner Denver Model 17, Wght. 190 lbs. for 1 1/4" steel.

JACK HAMMERS
52—Jackhammers for 1" and 3/4" steel—Ing. Rand Models 849, DCR23, Gardner Denver Mod. 37 and 11 D.
Also riveting and chipping hammers. Paving breakers, drills and reamers, grinders, etc.

3—Northwest Model 4, Serial No's 3441, 3445, 3495 with 40' boom, 1 yd.; also 1-yd. pull shovel.
1—Bucyrus Erie 1 1/4 yd., 23-B, A.C. electric tunnel shovel.
1—Northwest Model 104, Serial No. 3079, 45' boom, 1 1/4 yd. bucket; with 1 yd. shovel attachment.
1—Link-Belt Model K-42, Serial No. 1265, 45' boom, 1 1/4 yd. bucket; also 1 yd. trench hoe attachment or 1 1/4 yd. shovel front.
3—Northwest Model 105, Ser. Nos. 2556, 1645, 46' boom, 1 yd. bucket with one shovel attachment.
1—Bucyrus Erie Model 1055, Ser. No. 11084, 50' boom with 1 yd. bucket.
1—Koehring Model 301, Serial No. 544, 40' boom, 1/2 yd. bucket.

Send for Our New 64-Page Stock List.

EQUIPMENT CORPORATION OF AMERICA

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Phone: Kittenhouse 4554

CHICAGO—1119 So. Washtenaw
Ave. Phone Nevada 2406

PITTSBURGH—P. O.
Box 933, Phone
Federal 2000

FOR SALE—INDUSTRIAL LOCOMOTIVES

- 1 Plymouth 3 1/4 ton, 24" gauge
- 1 Plymouth 3 ton, 36" gauge
- 1 Plymouth 4 1/2 ton, 36" gauge
- 1 Plymouth 7 ton, 36" gauge
- 1 Plymouth 8 ton, 36" gauge

DUMP CARS

- 2 yd. Koppel End Dump 36" gauge
- Western Grader 2 yd. 24" gauge

NATURAL GAS ENGINES

- 2 Miller twin cylinders 190 H.P. each friction clutch, line shafting, etc.
- 1 Bessemer 20 H.P.

INDUSTRIAL SILICA CORPORATION
602 Stambaugh Building
Youngstown, Ohio

FOR SALE

One 1937 Stearns Power Stripper with 6" and 8" two core attachments.
Also 1000 flat steel pallets for 2" Solid Slabs.
2500—4" pressed steel pallets with four two inch round core holes.
1000—4" two core and 6000—8" two core Multiplex type pressed steel pallets.
All in good operating condition.
Address Box 991, Care of Rock Products, 309 W. Jackson Blvd., Chicago, Ill.

SHOVELS & DRAGLINES LOCOMOTIVES

- 1—Model K-480 Link Belt Dragline or Crane D 17600 Caterpillar Diesel Engine, 75' Boom, 2 1/2 yard Page Bucket. Used one year and completely overhauled.
- 1—Model K-480 Link Belt Dragline or Crane 7x7 Hesselman oil engine, 75' Boom, 2 yard heavy Page Bucket. Serial 1689. Overhauled.
- 1—Model 95 Lorain Dragline or Crane, D 13900 Caterpillar Diesel Engine, 70' Boom, 2 yard Page Bucket. Completely overhauled.
- 1—Model 75A Lorain 1 1/4 yard Gas Shovel Serial No. 4137. Good working order.
- 4—Class 26—40 Ton 38" Gauge Heister Geared Locomotives. Good Condition. A.S.M.E. boilers.
- 1—Model FD 14 Allis Chalmers, 108 H.P. Angle-doser. Used 3 months.

FRANK SWABB EQUIPMENT CO.
Telephone 3906 Hazleton, Pa.

CRUSHERS

GYRATORY: 42" Gates K. 30" Superior McCully (Like new). 20" Superior McCully. Gates Nos. 12, 10, 9, 8, 7 1/2, 6, 5, 4, 3, 2, 1 (75 avail.). Tel-smith Nos. 4, 5, 6, 8C, 9 & 10. Also many Austins, Kennedys and Trailers, many sizes.
JAW TYPE: Traylor 60x34, 48x30, 42x24, 24x12. Superior 84x36 & 24x36. Buchanan 30x24. Farrel 60x45, 30x36, 24x30, 18x36, 15x24. Good Roads 1030. Acme 24x40. Misc. 7x12, 9x16, 8x20, 8x24, 12x24, 9x36, 9x30, 15x36.
REDUC. TYPE: Kennedy Nos. 25, 37 & 49. Tel-smith 5-F & 40. Traylor 36" 72, 8", 10", 13". Super. McCully 6" & 12". Newhouse 8, 7 & 18". Symons Cone & Disc Ty. 3" to 4".
ROLLS: Allis-C. 13 1/2x12, 36x16, 48x15, 54x24 & 72x30. Fairmont 36x30 & Jeffrey 24x24 to 36x54 single roll. Cornish 36x14 & 42x16, Etc. Etc.
HAMMERMILLS: Williams No. 1, 2, 3, 4, 5 & 9. Jeffrey 36x18 & 24x24. Day Nos. 20 & 40. Etc.
MILLS: Kennedy Ball 4x6, 5x6 & 6x8. Marcy 8x6 & 10x8. Hardinge 6'x3', 8'x3' & 6'x3'. Misc. Tube Mills 5' & 6' x 22". Sturtevant Ring Roll. Raymonds, Kents, Fuller-Lehigh, Etc. Etc.
CRUSHING PLANTS: No. 65 Diamond. No. 22 Pioneer 8x34, 1030 Good Roads, 9x10 Austin-Western, 9x36 C.R.

MISCELLANEOUS ITEMS

Barges, Bins, Buckets, Rollers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryer, Derrick, Draglines, Drag Scrapers, Dredges, Drills, Engines, Elevators, Excavators, Generators, Hoists, Kilns, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, Etc. in many sizes, types and makes at low prices. (I have equipment at many points in the United States and Canada. What you need may be near your plant.)

ALEXANDER T. McLEOD CHICAGO
7229 Rogers Avenue

NEED DUMP CARS?

FOR SALE 155

20 and 30-yard Capacity—All-Steel—Clark, Magor, Koppel and Western—Both Up-turning and Down-turning Door Types
Immediate Delivery!!! All Priced to Move Quickly
Other Types of Cars, Too
ALSO LOCOMOTIVES, CRANES, SHOVELS
IRON & STEEL PRODUCTS, INC.
36 YEARS' EXPERIENCE
13492 S. Brainard Ave., Chicago, Illinois
"Anything containing IRON or STEEL"

FOR SALE

AT AKRON, N. Y.

3—5x10 Double Deck, Niagara Vibrating Screens
1—4x8 Double Deck, Niagara Vibrating Screen
2—No. 8, Style K, Gates Gyratory Crushers
2—No. 8, Style K, Gates Gyratory Crushers
30—"Marblehead" type, 36" gauge, Quarry Cars
Buffalo Crushed Stone Corporation
Buffalo, N. Y.

10—Jaw Crushers: 3—15x36" Universal; 1—15x36" Cedar Rapids; 1—15x36" Champion; 1—12x36" Acme; 2—10x30" Climax No. 54; 1—9x18" Tel-smith No. 9A; 1—9x15" Champion.
1—Set of Allis-Chalmers, smooth type crushing rolls, 42x18".

DREDGE PUMPS

1—12" Morris Heavy Duty D. C. to 100 H.P. dbl. cyl. steam engine.
2—Belt Driven: 2—Morris Mang., 1—10", 1—8", 1—6".

HOISTS

1—2 Yd. Thomas, 2 speed, Class L Cableway excavator hoist with 150 HP electric motor.
1—National 50 HP drag-scraper hoist for handling 1 yd. bucket with 50 HP electric or gas power.
1—1 Yd. Cedar Rapids 2 speed drag-scraper hoist with 50 HP electric or gas power.
1—1 Yd. Kern variable speed drag-scraper hoist powered by 50 HP electric motor.

LOCOMOTIVES

13—Electric and gas power standard 36" and 24" ga.: 1 7-ton Plymouth, 4 7-ton Witcomb, 1 6-ton Brookville, 1 6-ton Whitcomb, 2 4-ton Vulcan, 2 4-ton Whitcomb, 1 3 1/2-ton Plymouth, 1 2-ton Whitcomb.

1—9" x 16" bronze bearing DIAMOND jaw crusher complete with flywheels and Model P287TD3 Lokut motor mounted on trailer unit with steel wheels.....New
2—Pitman assemblies with S.K.F. bearings including main bearings for 10" x 20" jaw crusher.....New
1—10" x 20" roller bearing DIAMOND jaw crusher.....New
1—15" x 36" pitman assembly—new design with 8" shaft, including main bearings.....New
1—Bucket elevator 32 1/2" center-to-center type, with buckets 13" x 6" x 7 1/2" mounted on belt.....New
*1—Pitman assemblies for 10 x 20 jaw crusher, bearings S.K.F. type, slightly Used
*1—Pitman assemblies for 10 x 30 jaw crusher, bearings Timken type.....Rebuilt
1—10 x 20 roller bearing DIAMOND jaw crusher equipped with Timken bearings.....Rebuilt
*1—10 x 30 pitman assemblies for 10 x 30 jaw crusher.....Rebuilt
*1—30" bucket elevator with buckets 10" x 8" x 7 1/2" mounted on chain.....Rebuilt
1—30" x 10' double shaker screen.....Rebuilt
1—Grizzly and hopper 6' x 8'—with 8" sq. openings and 30" x 5' plate feeder.....Good Condition
2—Quarry plants with 10 x 20 anti-friction bearing jaw crushers and bucket elevators, mounted on trucks with four steel wheels.....New

USED EQUIPMENT IMMEDIATE DELIVERY

2—30 cubic yard bins, 3-compartment, no jack legs.....New
1—No. 25 hog, anti-friction bearing type with cast steel discs.....New
6—Steel wheels 40" dia. x 16" face to take 4" Hyatt bearings.....New
4—Steel wheels 40" dia. x 10" face to take 4" Hyatt bearings.....New
4—Steel Wheels 28" dia. x 4" face, bore 1 1/2".....New
10—Steel wheels 28" dia. x 5" face, bore 1-15/16".....New
8—Steel wheels 24" dia. x 3 1/2" face, bore 1 1/2".....New
4—Steel wheels 28" dia. x 14" face, bore 4" Hyatt.....New
1—Allis-Chalmers motor, 25 hp.....Reconditioned
1—Allis-Chalmers motor, 60 hp.....Reconditioned
The above pitman assemblies can be installed in new bases and furnished as complete machines.
DIAMOND IRON WORKS, INC. AND MAHR MANUFACTURING CO. DIV. MINNEAPOLIS, MINNESOTA

FOR SALE

Worthington 10" Centrifugal Pump
2000 gallons capacity, directly connected to 100 HP electric motor 1775 RPM, 440 volts, 60 cycle, 3 phase. Mounted on base. Perfect shape.
CARLTON CONCRETE GRAVEL CO. CARLTON, MINN.

HYDRATORS
3 Kritzer & Schullies Hydrators.

AIR COMPRESSORS
BELTED: 355, 525, 675, 1000, 1300 & 1570 Ft. ELECTRIC: 475, 675, 807, 1302, 1722 & 2200 Ft. DIESEL: 605, 807 & 1900 Ft.
PORTABLE GAS: 110, 160, 220, 310, 540 & 1200 Ft. STEAM: 40, 510, 535, 1300, 2200 & 3600 Ft.

CLAMSHELL BUCKETS, SKIPS & GRAPPLERS
Owen B. A. & H. Stone Grapplers.
2 Yd. OWEN Type B Material Handling.
1 1/2 Yd., 1 Yd. & 3/4 Yd. HAYWARD Class E.
40 Steel Skips 6 1/2 x 6 x 2 1/2.
5 Ton Bucyrus Rock Grabs.

CRANES AND DRAGLINES
1/2 Yd. 5 Ton O & S 30 Ft. Boom.
12 Ton NORTHWEST 50 Ft. Boom Gas.
20 Ton LIMA 750 Diesel, 65 Ft. Boom.
20 Ton BROWNING & S. 30 Ton AMERICAN Loco.
25 Ton LINK BELT K-48 Electric, 70 Ft. Boom.

CATERPILLAR SHOVELS
1/2 Yd. Lima Diesel.
2 Yd. Marion Steam Shovel.
3 Yd., 1 1/2 Yd., 1 Yd. & 4 Yd. MARION Electric.
1 Yd. NORTHWEST Gas.
1 1/2 Yd. LIMA Diesel.
1 1/2 Yd. BUCYRUS 41B Steamer.
4 Yd. Bucyrus 120B Electric. Also 3 Yd. Erie Elec.

DUMP CARS
46-KOPPEL 1 1/2 Yd. 54 & 10 In. Ga. V Shaped.
15-2 Yd., 3 Yd., 4 Yd., 5 Yd., 12 Yd., 36 In. Ga.
20-Std. Ga. 12 Yd., 16 Yd., 20 Yd. & 30 Yd. Cap.
15-Std. Ga. 50 Ton Battleship Gondolas.

FLAT CARS
9-50 ton std. ga. heavy duty flat cars.

HOISTING ENGINES
Gas: 15, 30, 60, 100 & 120 HP.
Electric: 30, 52, 80, 100 & 150 HP.
Steam: 6 1/2 x 8, 7 x 10, 8 1/2 x 10, 10 x 12, 12 x 14.

DIESEL UNITS
75, 90, 120, 200 HP. E. M. Engines.
110 HP. Ingersoll Rand Engine.
175 KVA Worthington 3/60/2300.
275 KVA Fairbanks 3/60/2300.

BALL, ROD AND TUBE MILLS
6x8 Pebble Mill & 3x3 Batch Mill.
5"x23" HARDINGE CON. Dry Ball Mill.
6"x22" HARDINGE CONICAL Pebble Mill.
8"x22" HARDINGE CONICAL Ball or Pebble Mill.
4x8, 8x8 & 10x8 Straight Ball Mills.
4x10, 5x10 & 5x22 Tube Mills & 6"x22".
3 1/2 x 8 & 5x7 Air Scept Tube Mills.
2x4 1/2, 6x12 & 5x12 ROD MILLS.

PULVERIZERS
JEFFERY 24x20 & No. 1 Sturtevant Ring Roll.
RAYMOND Auto. Pulverizer No. 0000, 0 & 3.
RAYMOND Imp. Mills No. 4, 22 & 55.
GRINDLER 30x18 Mill & Jay Box No. 8 & 4.
RAYMOND 4 & 5 ROLL MILLS & 5 ft. Chaser M.

STEEL STORAGE TANKS
10,000 Gal., 15,000 Gal. & 20,000 Gal. Cap.

MATERIAL BIN
116 Ton Blaw Knox 2 Comp.

400 BARREL CEMENT BIN
400 Barrel Butler Portable Steel Cement Bin with Fuller automatic batcher, push button control.

SEPARATORS AND COLLECTORS
5, 10 and 14 Ft. Separators, Garco & Bradley.

ROLL CRUSHERS
36x60 Fairmont & 36x20 Diamond.

JAW CRUSHERS
10x15, 12x17, 14x17, 15x17, 16x17, 16x12, 16x10, 18x11, 20x15, 30x15, 30x13, 30x12, 30x11, 30x10, 30x8, 30x6, 30x4, 30x3, 30x2, 30x1, 30x0.5, 30x0.25, 30x0.125, 30x0.0625, 30x0.03125, 30x0.015625, 30x0.0078125, 30x0.00390625, 30x0.001953125, 30x0.0009765625, 30x0.00048828125, 30x0.000244140625, 30x0.0001220703125, 30x0.00006103515625, 30x0.000030517578125, 30x0.0000152587890625, 30x0.00000762939453125, 30x0.000003814697265625, 30x0.0000019073486328125, 30x0.00000095367431640625, 30x0.000000476837158203125, 30x0.0000002384185791015625, 30x0.00000011920928955078125, 30x0.000000059604644775390625, 30x0.0000000298023223876953125, 30x0.00000001490116119384765625, 30x0.000000007450580596923828125, 30x0.0000000037252902984619140625, 30x0.00000000186264514923095703125, 30x0.000000000931322574615478515625, 30x0.0000000004656612873077392578125, 30x0.00000000023283064365386962890625, 30x0.000000000116415321826934814453125, 30x0.00000000005820766091346740717578125, 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Used Equipment for Sale

FOR SALE

Besser Super Stripper—Pallets and attachments for complete line of blocks from 2" to 12", double brick, etc. For anyone wishing to enlarge their capacity, this machine with automatic pallet feeder and many improvements added, is a great buy. Write or wire.

MEDIA CONCRETE PRODUCTS CO.
Media, Penna.

Welding Outfits \$29.75 to \$76.06
Electric Arc Welders \$155.00 to \$225.00

**SUPERIOR OXY-ACETYLENE
COMPANY**

HAMILTON Dept. W **OHIO**

FOR SALE

1937 2½ Yd. Jaeger, truck engine drive, mixer on 1937 29H Federal, good condition—Complete or will sell mixer only.
1200 8x16 Pressed steel pallets @ 5c.
1000 12x16 Pressed steel pallets @ 7c.
33½ A.S. some corners.

Bedford Hills Concrete Products Corp.
Bedford Hills, New York

Used Equipment Wanted

WILL BUY COMPLETE QUARRY PLANT or the Principal Parts Listed Below:

36 x 42 to 36 x 45 JAW CRUSHER
3 Ft. or 4 Ft. CONE CRUSHER
2 Yd. or 3 Yd. SHOVEL
40 Ton Switching LOCOMOTIVE
600 Ft. BELT CONVEYOR 36 or 42 In.
25 or 30 Ton LOCOMOTIVE CRANE
2—1000 Ft. or 1—2000 Ft. AIR COMPRESSOR
4 x 10 or 12 Ft. VIBRATING SCREEN
500 Ton STEEL BIN
250 to 350 H.P. DIESEL UNIT
Box 679, Darien, Conn.

CEMENT MACHINERY WANTED FOR THREE PLANTS

For 50, 100, and 150-ton capacity per 24 hours with or without diesel plants. Will act quickly if price attractive. Please write full details to Cia. Occidental de Maquinaria y Metales, S. A., Constitucion, 203, Mazatlan, Sinaloa, Mexico.

Business Opportunities

BUSINESS FOR SALE

Norwalk Mold Company in business since 1912 Selling Molds and Territorial Rights for Manufacture of Concrete Burial Vault. Includes all Patterns, Office Furniture and Fixtures, Files and Good Will. Write

NORWALK MOLD COMPANY
Office, Citizens Bank Bldg., Norwalk, Ohio

FOR SALE

Up to 5000 Acres of Tennessee

PHOSPHATE LANDS
Mineral Rights or Fee Simple

**BEST AND SAFEST PLACE TO INVEST
IDLE MONEY**

H. D. Ruhm Columbia, Tenn.

Consulting Engineers

H. J. BROWN

CONSULTING ENGINEER

35 Doane Street Boston, Massachusetts
Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.

Consultation
Examinations
Reports

Design
Construction
Supervision



WE LOOK INTO THE EARTH

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other materials.
**PENNSYLVANIA
DRILLING CO.**
Drilling Contractors
Pittsburgh, Pa.

ARE YOU FACED WITH QUARRY BLASTING COMPLAINTS

Blasting vibrations graphically measured with automatic recording instruments.

**VIBRATION MEASUREMENT
ENGINEERS**

211 WEST WACKER DRIVE CHICAGO
Telephone State 9363

F. M. WELCH ENGINEERING SERVICE

Consulting Engineers Greenville, Ohio
Designers of GRAVEL PLANTS for 30 years
SMALL PLANTS to meet local conditions with flexibility, ample crushing, minimum labor, low first cost and maintenance.
LARGE MODERN PLANTS for metropolitan areas.
GROUND STORAGE Plants.
OLD PLANTS modernized.
CONSULTATION REPORTS

DIAMOND CORE DRILLING HOFFMAN BROS. DRILLING COMPANY BIRMINGHAM, ALA.

We drill for any mineral. We have more than fifty gasoline, electric and steam drills, adapted for any job. Satisfactory cores guaranteed. Our prices are right.

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CLAVELACK, N. Y.**

The outside viewpoint of an experienced engineer may help in solving operating problems at your plant.

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Analytical and Consulting Chemist

323 Main St. Danbury, Conn.

Specialty—The Chemical Analyses of Carbonate and Silicate Rocks

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Classified Ad
It Pays**

Positions Vacant

DRAFTSMAN—DESIGNER.—EXPERIENCED in lime, cement, gypsum, or similar industrial plant design and operation. Permanent position. Location—central Pennsylvania. Reply giving age, education, detailed experience, salary, draft classification, and how soon available. Address Box 995, Care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

SALES ENGINEER: PREFERABLY familiar with crushing, screening and milling operations in mines, rock and gravel plants. Write giving age, education and record of experience in these industries. Address Box 994, Care of Rock Products, 309 W. Jackson Blvd., Chicago, Ill.

WANTED: ASSISTANT SUPERINTENDENT and Master Mechanic for midwestern cement plant. In reply give full particulars, where and how long employed, experience and salary desired. Address Box 993, Care of Rock Products, 309 W. Jackson Blvd., Chicago, Ill.

Positions Wanted

RESEARCH AND DEVELOPMENT ENGINEER

Specialized in Radical Cement Kiln Improvement and Efficiency Work

Now available. Has built more than 300 experimental furnaces. Made 18 inventions. His cement kilns are internationally known and save 2 million dollars yearly. War conditions compel occupational change. Age 56 and still keen for new problems. Prefers work with cement mill equipment manufacturer or large cement company. Address Box 988, Care of Rock Products, 309 West Jackson Blvd., Chicago, Ill.


POSITION WANTED AS TOOL DRESSER or Driller. A thorough knowledge of Blast Hole drilling. Experienced in Blasting and plant repair work. 28 years in general quarry and similar work. 45 years old. I am open to any reasonable offer with a good concern. Address Box 992, Care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

POSITION WANTED—MECHANICAL engineer, 40 years in building and operating stone crushing plants and operating quarries. References. Have built 35 plants in 19 states. Handled 95 men on one job. Have installed 50 ton castings. "Experience is the best Teacher." Address Box 985, care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

POSITION WANTED—PLANT MANAGER, with a thorough knowledge of lime burning, shaft kilns, fine grinding, hydration, open and mine quarries, cost and maintenance, and experience with all kinds of fuel. Have produced agricultural, chemical, and building lime. Twenty (20) years experience. Address Box 935, Care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

POSITION WANTED—BY EXPERIENCED Limestone Sales Representative that is familiar with marketing, production of, and freight rate structure on Crushed Stone, Agricultural and Pulverized Limestone. Address Box 986, Care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

POSITION WANTED — YOUNG CEMENT chemist, 10 years experience as chief chemist including cements desires new location. Address Box 982, care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.




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Profitable bucket operation is dependent in a great measure on the ability of the bucket to penetrate deeply into material being excavated or rehandled; to exert a powerful closing force and to lift "A Mouthful at Every Bite." Resultant performance with "More Bites per Day" and long bucket life substantiate the claim that OWENS hit "Pay Dirt" every time.

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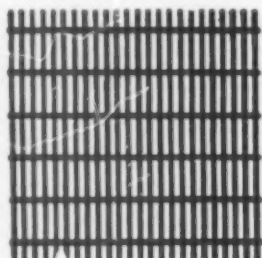
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A MOUTHFUL AT EVERY BITE



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ALLOY
No. 2

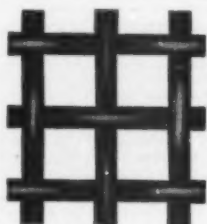
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You'd say it was the greatest buy in the wire rope market.

When you measure the service that every twelve inches of Wickwire Rope gives the user in comparison with accepted standards, you find Wickwire offers sixteen, eighteen, yes and twenty-four inches and more in value for every twelve inches of rope you pay for.

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BAT WITH A**

Broomstick



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Automatic
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Without obligating me in any way, mail a copy of your new descriptive bulletin titled "Your Dragline CAN Move Dirt Faster."

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The strength, toughness and incomparable resistance to abrasive wear makes TISCO manganese steel chain the most dependable material available to maintain sustained production.

During this national emergency, industry cannot afford costly shutdowns for frequent repairs. TISCO products will keep your plant running longer and steadier.



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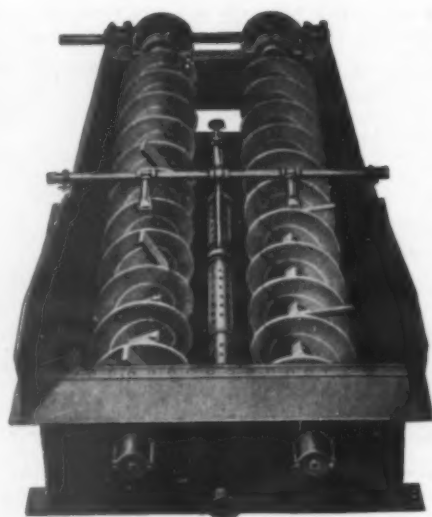
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Eagle washers and dewaterers are meeting these tough demands. This is because Eagle engineers have developed a special technique for solving your problems. Each problem is considered as a separate case. Then, after a thorough study, recommendations are made for the type of arrangement that would best produce a quality product. The complete line of Eagle washers and dewaterers makes it possible to suggest the machine that will satisfactorily do the trick, and new machines are being constantly designed to fit each individual case.

Our thorough knowledge of washing problems and their solutions has been incorporated into the Eagle washers and dewaterers—and is part of the reason for their high quality operation.

Our years of experience are ready to help solve your 1941 emergency problems. Write today for full details about the EAGLE SCREW WASHERS, EAGLE PADDLE LOG and EAGLE "SWINTEK" SCREEN NOZZLE LADDER.

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LONGER—SAFER—SERVICE with AMERICAN CABLE TRU-LAY

Preformed

★ Industrial operators everywhere have found that American Cable TRU-LAY Pre-formed Wire Rope will do more and better work—for a *much longer time*. That means fewer machine shutdowns, steadier production, reduced loss of man-hours.

American Cable TRU-LAY gives longer service because it is pre-formed. It is a relaxed, flexible, limber rope—free of internal torsional stresses which shorten rope life. It resists kinking, handles easier, requires no seizing when cut. Being pre-formed, TRU-LAY possesses high resistance to bending fatigue. It spools better and resists rotating in sheave grooves.

Equally important to long life, TRU-LAY Pre-formed is a safer rope. Broken crown wires lie flat and in place—refusing to wicker out and become chisel-sharp jagers to tear workmen's hands or clothing. Specify American Cable TRU-LAY Pre-formed for your next line. Return the coupon today for your free copy of the instructive book "GREATER DOLLAR VALUE." All American Cable Ropes made of Improved Plow Steel are Identified by the Emerald Strand.



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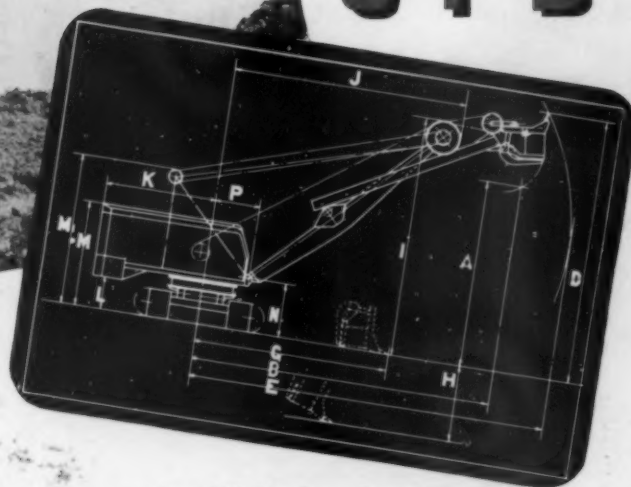


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**BUCYRUS
ERIE**

54-B



Newest in the Bucyrus-Erie family of champions, the 2½-yard 54-B electric is a machine offering real savings to quarry owners. Highly mobile for maximum usefulness throughout the pit, this 54-B can handle stripping, and do a real job on heavy-duty rock loading as well. Scientifically designed and built for the job it has to do, the 54-B is a balanced machine with a combination of speed and strength that means big production and low operating costs. It will more than pay its way in any pit.

In addition to the electric machine, the 54-B is also available with diesel power. Choose either type of power, and you have a years ahead Bucyrus-Erie, the champion in its class.

MACHINERY:

Hoist drum, pitch diameter.....	31"
Diameter of boom point sheaves.....	42"
Diameter of padlock sheave.....	24"
Diameter of hoist rope — two part.....	1¼"
Diameter of boom suspension rope — 8 part.....	¾"

Shovel Working Range Dimensions

Dipper capacity.....	2½ cu. yd.
Length of boom.....	28'-0"
Length of dipper handle.....	18'-0"
Angle of boom.....	45° 50°
A — Dumping height — maximum.....	13'-8" 21'-6"
B — Dumping radius — at maximum height (A).....	31'-3" 29'-9"
B1 — Dumping radius — maximum.....	33'-0" 32'-3"
D — Cutting height — maximum.....	29'-6" 31'-9"
E — Cutting radius — maximum.....	37'-6" 36'-9"
G — Radius at level floor.....	23'-3" 22'-9"
H — Digging depth below grade — maximum.....	9'-0" 8'-3"
I — Clearance height — boom point sheave.....	28'-0" 29'-9"
J — Clearance radius — boom point sheave.....	27'-0" 25'-3"
K — Clearance radius of revolving frame.....	13'-9" 4'-3"
L — Clearance under frame to ground level.....	12'-3½"
M — Clearance height — boom and A-frame lowered.....	17'-8"
M1 — Height of A-frame.....	8'-3½"
N — Height of boom foot above ground level.....	5'-3"
P — Distance boom foot to center rotation.....	

ELECTRICAL EQUIPMENT: (WARD-LEONARD)

M.G. Set driving motor (induction).....	125 H.P.
Hoist motor.....	60 H.P., 230 volt, 75° C. Cont.
Swing motor.....	23 H.P., 230 volt, 75° C. Cont.
Crowd motor.....	23 H.P., 230 volt, 75° C. Cont.
Generators for W. L. control are equivalent in capacity to their respective motors.	

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